

# **From design thinking to commercialisation of innovation- Case: Bio-Xylitol production technology in cosmetics and skin care market**

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<p>Bio- Xylitol production technology has been developed by a group of principal Bio chemical scientists from Chemical Process Technology Department – VTT Technical Research Centre of Finland. The technology was a result from Biocore – “Tomorrow’s biorefineries in Europe” - FP7 project, funded by The European Commission, under contract no FP7-241566 (2010-2014), with cooperation among VTT, CIMV, SYRAL, Nova Institut and Ifeu.</p> <p>The aim of this thesis is to find out commercialising opportunities for Bio- Xylitol production technology in cosmetics and skin-care market by using design thinking approach. Hence, the objectives of the thesis are to provide the commissioner, VTT Finland, a comprehension of cosmetics and skin care products’ user profiles; and to suggest on prospective way for commercialisation.</p> <p>Accordingly, the theoretical framework of this thesis contains the mindset and role of design thinking in innovation; characteristics, different frameworks and process of design thinking. The theoretical framework seeks to highlight design thinking as a nonlinear and human-centric approach, in which personas act as a crucial contribution leading to prototyping.</p> <p>Concerning project’s process, benchmarking, contextual interview, netnography, structured collaboration sense-making techniques, and secondary data research are methods and tools utilised during the project. After that, the data was synthesised to create three personas, including a focal persona whom the prototype was mainly designed for.</p> <p>The result presents three cosmetics and skin care products’ user personas; and the prototype of a Mix-it-yourself box.</p>	
<b>Keywords</b> Design thinking, human-centric design, personas, customer insights, prototype	

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# 1 Introduction

We are now living in a world of design thinking. As Arne van Oosterom, founders of DesignThinkers Academy said: "Design Thinking is a mindset, not a toolkit or a series of steps"; the concept of design thinking has been evolved over the past decade and defined as thinking like a designer would. More concretely, design thinking is a creative approach to solve a problem or a way to match the needs of people with business and convert these needs into markets' opportunities (Brown 2008, 62). Designers generally approach to a problem by interaction; they quickly produce and test different prototypes, get feedbacks and develop on final solutions.

When searching for the term "Design thinking in" google search engine, there are various suggestions about design thinking in education, in healthcare, in schools or in business. This also reflects that design thinking can be applied in a large number of situations, such as when a new idea or breakthrough concept is needed. Design thinking suits very well with "quickly changing market", in which the needs of users are "uncertain" (Luchs, Griffin, & Swan, 2015, 12). This approach can avoid the trap of producing a single and concrete solution in a project and encourage flexibility to discover, ideate and test concepts. Design thinkers; therefore, have room to uncover deeply the needs of people, to utilise different stakeholders, resources, and to develop a creatively effective solution.

When it comes to commercialising scientific research, there is not a single path, even though industry has more connection to scientific research to share human capital. It is hard work to see and try whether a scientific breakthrough can be commercialised or not. The reason is because what drive science might not drive business. The way to evaluate scientific research is determining how a research can make an original contribution to the understanding of the world, while business has other rationale of making more money. Hence, the users are the ultimate review. If a scientific result can add value to the community, there is possible commercialising chance (Fletcher & Bourne, 2012).

Accordingly, an approach of design thinking with designing tool was chosen to assess commercialising opportunities of new Bio-xylitol production technology. The human centric characteristic of design thinking is believed to be a powerful tool when there is not yet a concrete commercialising idea.

## **1.1 Aims and objectives**

Bio- Xylitol production technology has been developed by a group of principal Bio chemical scientists from Chemical Process Technology Department – VTT Technical Research Centre of Finland. The technology was a result from Biocore – “Tomorrow’s biorefineries in Europe” - FP7 project, funded by The European Commission, under contract no FP7-241566 (2010-2014), with cooperation among VTT, CIMV, SYRAL, Nova Institut and Ifeu.

The aim of the thesis is to find out possible approach to commercialise Bio-xylitol production technology in cosmetics and skin-care products. The commercialising approach is determined by setting the users as the centre of the research, understanding users by using qualitative data and investigating secondary data about cosmetics and skin care market in Finland. The objective of the thesis, consequently, is to provide commissioner a comprehension of cosmetics and skin care products’ user profile; and to suggest on prospective options for commercialisation. To do so, the thesis author seeks to answer two sub questions:

- (1) Which values Bio- Xylitol cosmetics or skin care products can bring to customers?
- (2) How do customers consider those values?

Furthermore, value definition, from the customer point of view, refers to the values that are “envisioned by the customers themselves towards service or product providers” (Woodruff, 1997, 141). Before that, in 1988, Zeithaml defined value by the comparison between what is given (prices, sacrifices...) and what is received (qualities, benefits...), value is the overall assessment of the product’s utility based on perceptions of what customers give and what they receive. Also, Buz and Goodstein in 1996 stated the emotional bond between the customer and producer of product or service in customer value; this impressed the idea that customer value is always perceived by the customers rather than the seller/provider. More recently, in 2006, Anderson defined values as the points or focuses that matters to the customers such as cost, use value, emotional value, social value. Meanwhile, the desired needs of customers change over time. In this project, from design thinking approach and qualitative data synthesis, customer value towards Bio-xylitol in cosmetics and skin care market can be examined.

## **1.2 Methods and tools used in the project**

Commercialisation of a breakthrough is defined as a process of addressing what people or businesses are willing to pay for (Fletcher & Bourne, 2012). To deal with a complex issue or wicked problems, design thinking can be an appropriate choice. According to Rittel,

most problems from designers are wicked problems, which mean “ill-formulated” problems with confusing information, various stakeholders, different values and more than one possible solutions (Buchanan, 1992, pp. 5-21). The method of design thinking helps not only to solve problems but also lead to potential innovation from creativity and during the process. Explanations and discussion about this method are described in further detail in the next chapter of the thesis: theoretical framework.

Concerning the tools utilised in this project, various design thinking tools were applied in every step. Since the aim focuses on interpreting the users to develop commercialising approach for Bio- Xylitol production technology, qualitative research method of contextual interview, observation and net-nography were all involved. Moreover, due to the collaborative nature of design thinking, structured collaboration sense-making techniques (e.g. post it-notes, and brainstorming...); tools such as value proportion canvas and business model canvas were also utilised, especially during the stage of synthesising data collected. In addition, secondary data analysis, a flexible investigation to learn what is already known, is as crucial as collecting primary data (Johnston, 2014, 619-626) so that the method was used to examine the context of current cosmetics and skin care market in Finland.

After that, the data collected was used to create user personas, which was a crucial part for prototyping stage. The prototypes were built to serve the needs and solve the problems of focal users as the testing of prototypes to get feedbacks is an essential step. At the end, only one prototype received positive feedback from the users; and it was chosen to be progressed further and suggested to thesis commissioner. As this is a design thinking project, the process was far from linear. Each method, tool and research process is described in detail in chapter three of this thesis.

### **1.3 Structure of the thesis**

This thesis consists of six major chapters representing these subjects respectively: (1) introduction, (2) theoretical framework, (3) visualising the process – methods and tools, (4) project background, (5) deliveries, and (6) discussion. The following chapter of theoretical framework describes all theories that this thesis is based on, beginning with literature review of what is design thinking, following by the characteristics of design thinking, its non-linear approach, and ending with personas as a design thinking tool. In the part of “What is design thinking?”, the mindset of design thinking and its role in innovation are inspected.

Afterwards, characteristics of design thinking are outlined by customer insights and human centric position in design thinking; with other qualities like action-oriented and iterative. These theories create a basis to understand next theories about design thinking framework and process, grasp true reasons why design thinking process cannot be linear. The process is evaluated from its framework to actual stages/ modes in practice. Finally, the last part of the theoretical framework regards personas as a design thinking tool with definition, contributions during the process and ways to create and use personas.

The next chapter after theoretical framework visualises the process of this design thinking project with definition, explanations on methods and tools utilised. Once all related theories and clarification on methods and tools are presented, the context of this project or project background is revealed with overview on cosmetics and skin care market in Finland, introduction about Bio- Xylitol production technology and scenario of the thesis project. The fifth chapter, subsequently, indicates deliveries by data synthesis result, three user personas and an eventual prototype. To end the thesis, chapter six discusses final thoughts of thesis's authors with limitations of the project and suggestion on further studies.

## 2 Theoretical framework

### 2.1 What is design thinking?

Is design thinking only a unique approach to solve problems with creativity and empathy? Despite that creativity and empathy play an essential part in design thinking, the number of academic articles and books concerning this topic has grown fast over the past decades, proving that design thinking requires more than creativity and empathy. For example, some renowned authors include Kelley and Littman- 2005; Brown and Martin 2009, Liedtka and Ogilvie- 2009 or Verganti 2009. In this initial part of the theoretical framework, we discover design thinking mindset and its role in innovation to determine the most crucial factors for definition.

#### 2.1.1 The mindset of design thinking

The idea of design thinking as a way of thinking can be traced back since 1969, in the book of “The sciences of the Artificial” from Nobel Prize Herbert Simon- an American economist, psychologist, sociologist and professor at Carnegie Mellon University (Mootee, 2013, 29). He defined design as the “transformation of existing conditions” into a better version or situations. Moreover, the term “design thinking” has gained real attention since it was used as a title of the book by Peter Rowe- Dean of the Harvard Graduate School of Design in 1987. Multiple models of design thinking have been emerged and nowadays, design thinking can be seen as a mindset to approach to various problems in many fields such as business operation, technology development, social innovation or education.

Steve Jobs once said that :*“Most people make the mistake of thinking design is what it looks like. People think it is this veneer- that the designers are handed this box and told- make it look good! That is not what we think design is nowadays. It is not just what it looks like and feels like. Design is how it works”*. What could be the optimal way to discover how a thing might work? The answer focuses on having empathy with people who really use the products or services. Empathy always plays a crucial role in design thinking and this is a characteristic that can distinguish design thinking from other problem-solving approach. Empathy supports design thinking process by transferring “rational and practical issues” into “personal experiences and private contexts” (Mattelmäki, 2006, 19).

Even though there is no common definition for the term “design thinking”, according to Tim Brown, CEO of IDEO, design thinking is a style of thinking that considers the “ability to combine empathy for the context of a problem, creativity in the generation of insights and



solutions, and the rationality to analyse and fit solutions to the context". He also emphasised that design thinking is a "human-centred approach" to solve a problem and generally lead to innovation.

The problems that design thinking tends to solve are referred to as "wicked problems". The wicked problems approach was firstly formulated in 1960s by Horst Rittel (Buchanan, 1992, 98); and the wicked problem theory in design thinking was introduced by Richard Buchanan in 1992. These problems are unique, ill formulated with confusing information and conflicting values. They can have different explanations so that the solutions to wicked problems are not true or false but good or bad.

To solve these wicked problems, design thinking cycle involves inductive, deductive, and abductive reasoning. Abduction is the logical process of forming an illustrative hypothesis that can bring new ideas, deduction regards inference from the logical hypothesis; and induction is generalising from specific instances. These cognitive features explain design thinking cycle as design thinkers generate ideas by abductive reasoning, predict sequences by deductive reasoning, test ideas in real world, and generalise from the results by inductive reasoning (Dunne & Martin, 2006, 518).

Learning and reasoning within design thinking process, thus, is presented as a cycle of generating, analysing and evaluating ideas for the best possible outcomes. Because design thinking is a concept of approach or mindset, design thinking can be utilised by people with different backgrounds, skills and capabilities. At the end, design thinking must solve a problem and bring out solutions, this is also a process of "invention", and design thinkers would think of themselves as "creators" (Liedtka & Ogilvie, 2011, 16).

In the introduction part of this thesis, design thinking is described as "thinking like a designer would". This means that designers tend to discover and solve problems by interactions; they quickly approach to generate different possible solutions, develop prototypes, try out prototypes, collect feedbacks from all stakeholders and work on the final solutions. That spirit from designers is also the core of design thinking so that the final solution is gradually built from the true needs of the users.

The thesis project used a design approach because Bio-xylitol technology is an invention from scientists looking for chances of application in cosmetics and skin care market. The problems that thesis design needed to solve are wicked-problems. The ideas and opinions from the consumers; hence, can determine solutions or approaches to develop the technology. Even though characteristics and model of design thinking are described in later parts of this thesis, thesis's author initially seeks to establish and review design thinking's

definitions as a mindset. This helps to explain why she chose a designing approach for the project of Bio-xylitol.

### **2.1.2 Design thinking's role in innovation**

At first, design thinking's role in innovation can be understood better by investigating what does it mean by "innovation"? Innovation is regarded as a complex concept with multiple meanings; according to business dictionary, innovation is the action or process of innovating a new product, idea, method (Businessdictionary, 2017). How new ideas put into practice to create new values is crucial in innovation (Tidd, 2011). Also, in the Oslo Manual, distinction between invention and innovation was made in 2005: invention is defined as "the first occurrence of a new product or idea", while innovation is "the first attempt to carry it out in practice" (Fagerberg, 2005).

Design-driven innovation, otherwise, is the "research and development process" for the meanings or the process to make sense of things. Companies' executives can lead innovation strategy by design thinking approach to create products or services with radical new meaning. Those products or services can convey totally new reasons for customers to buy because of distinct meanings among current products or services that already dominate a market (Verganti, 2009, 8).

Regarding the innovation process model from Charles Owen in 1993, the process moves participants between concrete and abstract world and alternatively synthesising and analysing to generate new ideas, services, products or designs... Participants are required to be involved in both abstract conceptualisation and concrete experience. The model reflects that innovation process in real-world is non-linear with four spaces: observation (deep understanding of the context), frameworks (making sense of data collected, recognising patterns), imperatives (extracting data to define innovation's goals) and solutions (testing and selecting solutions) (Beckman & Barry, 2007, 29-44)

In addition, brands such as Ford, Apple, IBM, Nike or Coca-Cola are all design-led brands; these organisations can create their next competitive advantage through different innovations due to the approach of design thinking. Design thinkers explore, analyse and develop various outcomes and possibilities to create the most suitable solutions leading to innovations. For example, taken elderly population in many countries, the question regards how to take care of more elderly people in the future. Popular answer might be generating more social care personnel or services to adapt with more elderly people. Design thinkers, with their "radically innovative" mindset, understand not to look at elderly people as the problem but as "an agent for solution" with own willing, wishes, abilities and needs.

This different point of view can lead to real innovation within the society. Solutions can be that elderly people host young students who are willing to help (Manzini, 2015, 13).

When design thinking is used as innovation- driver, the “what” is transferred into the “why” and “how”- why people buy and how people use the product. This “why” and “how” message is not only about people’s purpose but also about an “emotional” meaning and connection, which is connected to personal motivation or individual purpose. Everything, from process to models, from products to services, has its meaning dimension and design thinkers concentrate on this dimension to create future innovation (Mark, David & Nelson, 2014, 142).

Meaning is not given but rather created or innovated by design thinkers from studying the end-users; and this reflects that meaning is changing constantly due to development in technology, knowledge or societies. When it comes to business, the design of business innovation is an ongoing learning and experimenting process that must be “open to emergent opportunities” (Shamiyeh, 2010, 379).

Hence, when should we apply design thinking? This approach works best in situations which require new concept, revolutionary ideas that bring significant impact or result. Additionally, design thinking is applicable when opportunities and problems are not clearly defined. Nowadays, design thinking has been used notably to deal with problems in information technology (IT) and business (Dorst, 2011, 521).

For instance, the term “engineering design” is used to describe innovation in product development with the word of “design”, which concentrates on new ideas’ generation and users’ needs instead of purely implementing new technology (Verganti, 2009, p. 23). New product development or markets changing quickly, such as wearable devices, can also take advantage of design thinking to discover uncertain needs of the users (Luchs, Griffin, & Scott, 2015, 12).

Having chosen the approach of design thinking for this Bio-xylitol project, thesis’s writer would like to bring a new insight and useful result for Bio-researchers at VTT Research centre of Finland from the users’ point of view (users are consumers in the cosmetics, skin-care products market). The researchers at VTT have developed a new technology of Bio-xylitol, which might be applied in the development of cosmetics or skin care products but researchers are considering whether to continue developing this technology or not.

Because both chances and challenges of the problem were not well-defined at the beginning, this kind of “wicked problem” is an opportunity for innovation. Design thinking, with its nature of encouraging innovation is regarded as a suitable approach.

## **2.2 Characteristics of design thinking**

What to bear in mind during a design thinking project? According to IDEO, design thinking is collaborative, empathic, integrative, subjective, optimistic and experimental. These six mindsets are the core spirits of design thinking. In this part, we can get a true grasp of design thinking characteristics, or the equipped mindset to get others’ point of view and see things from others’ angles as well as ours (Henry Ford). First and foremost, human - centered design (HCD) lies in the heart of design thinking.

### **2.2.1 Customer insights and human-centric in design thinking**

Human- centric design or HCD emphasises on the power of empathy. In practice, human-centric designers seek to understand and empathy with users in two dimensions: emotional empathy and cognitive empathy. Emotional empathy regards instinctive experience in which one feels other people’s experience; while cognitive empathy means that one understands the way others might experience (Gasparini, 2014, 9). Design thinking encourages utilisation of cognitive empathy as designers consciously understand the experience of users. In the late 1990s, empathy design was introduced and considered “a cultural shift”; as in 1997, this was a discipline with techniques to contribute to the flow ideas demanding further testing (Leonard & Rayport, 1997, 108).

Empathy helps design thinkers to be in someone else’s shoes and gain insights. Henry Ford, founder of the Ford Motor Company, is often quoted: “If I’d ask people what they wanted, they would have said faster horses”. In the 1990s, horses were nowadays’ car and customers knew that they wanted something better - faster; nevertheless, they could not envision a new car at all. Ford understood customers’ underlying needs and customer insights so that Ford cars were invented. Therefore, what are customer insights? According to Hope Neighbor and Lisa Kienzle, customer insights are a “deep understanding of a customer’s needs and behaviours - both known needs that the customer can identify, and the latent needs that they cannot” (Neighbor & Kienzle, 2012, p. 4)

Since customer insights play an important part in design thinking, design thinkers must focus on human and promote empathy towards users to creates ultimate shared meaning. Design Thinking processes usually employ various listening and observing techniques to

acknowledged different needs and insights. Common design thinking tools such as ethnography (which includes participant observation, contextual interviews, journey mapping...), prototype, cocreation, field experiments and structure collaborative techniques (brainstorming or mind-mapping) all emphasise on cooperation, team, human and learning (Liedtka, 2014, 925-938).

Besides, given the definition of design thinking by Tim Brown, President and CEO of IDEO, Tim said "Design thinking is a human-centered approach to innovations". A human-centered designer must believe that the people who face the problems are the people who holds key to solutions; believe that if the design thinkers "stay grounded" in what they see, ask, empathise and learn, a new solution can be created (IDEO.org, 2015, 9). The design thinking process must start from the people who use the designed products, services or tools because they are actual expert; while design thinkers are ready to fail "early and often", to test, to not knowing the answers many times. In short, to be human centric designers, they must be regular optimists, frequent makers, testers and learners with empathy and creativity.

### **2.2.2 Design thinking is action-oriented and iterative**

Design thinking is not only creative and human-centered but also action-oriented. "Design thinking becomes real when it is embodied in the team and is express as a new way of doing" (Forbath & Lynch, 2015, 6). Design thinkers are doers, makers and implementers who make something simple first and learn from it. It is not about how beautiful the solution is made, but it is about conveying the ideas to other people and getting feedbacks to make it better or to seek for another option. Acting, making it real instead of living in abstractions can push the ideas further and bring the next steps within design thinking process nearer (IDEO.org, 2015, 20). This can be regarded as the experimental perspective of design thinking.

Furthermore, in the book named "The design of business", author Roger Martin compared between style of work in traditional firms with that of design workshop; and expressed that working style of design thinking is collaborative and iterative. If ideas are exchanged actively within the group, participants show more interest, get new perspectives, get feedbacks and create more critical thinking (Gokhale, 1995). Even though the process involves creativity, having multidisciplinary collaboration to co-create together is essential. Empathy also makes design thinking an iterative series of steps that can be adapted based on what designers have learned and developed.

Because of this nature of design thinking, the process is usually described as an iterative cycle in which ideas are validated, re-designed or even re-defined (Plattner, Meinel, & Leifer, 2011, 15). Like David Kelley from IDEO said “Fail early to success sooner”, keeping an open mind to explore many possibilities until the optimal ones reveal and being fine with the uncertainty are the right mindset of a designer who can embrace ambiguity.

Other valuable quality of a design thinker comprises optimism, he should be an active learner and communicator with the belief that solutions for the problem are out there, from the people he designs for. Optimism can embrace possibilities, drive the process towards and make designers to focus on the good sides instead of large obstacles. Without optimism, there is little chance to overcome all barriers or tensions to tackle this iterative process repeatedly.

Design thinking is best described as “a system of overlapping spaces” rather than a sequence of steps (Brown & Wyatt, 2010, 30) so that the designers should be a constant learner seeing that the process is still going forward. An optimistic design thinking team can communicate efficiently both internally and externally to be inspired because people can be active influencers instead of passive experiencers for an idea.

## **2.3 Design thinking as a nonlinear approach**

Once the mindset and characteristics of design thinking are fully interpreted, the framework and process of design thinking can be discovered deeper. From the two first sections of the theoretical framework, in which we impressed the power and importance of flexibility with discipline, empathy with implementation, it is proper to note that design thinking is far from linear. However, in this section, to discover the approach of design thinking, and seek an established answer to the question “Is there a solid process for design thinking?”, its framework and process are researched further both in theory and in practice.

### **2.3.1 Design thinking’s framework**

Double Diamond, which is composed of two connected diamond shapes, is a popular representation of design thinking framework. It was introduced by the United Kingdom Design Council in 2005 to describe the way how designers approach and solve problems.

The first mode of discover express a “deep contextual dive” in the scenario of the challenge (Tenny, 2014, 112). At this stage, ethnographic techniques are used by designers to understand how people live, work... and these understandings are related into the context that is studied. The next stage of “Define” includes refining and narrowing the insights

gathered into patterns by designing tools. This helps to move on creating ideas or prototypes in Develop stage.

Furthermore, these stages prove that instead of “perpetuating the past”, design thinkers know to create future from insights they have collected (Martin, 2009, 158). While testing prototypes in Develop stage, the team can evolve ideas into mature solutions for last stage of Deliver or go back to develop better prototypes and do the testing again. This Double Diamond below present four common stages in a project with designing approach.

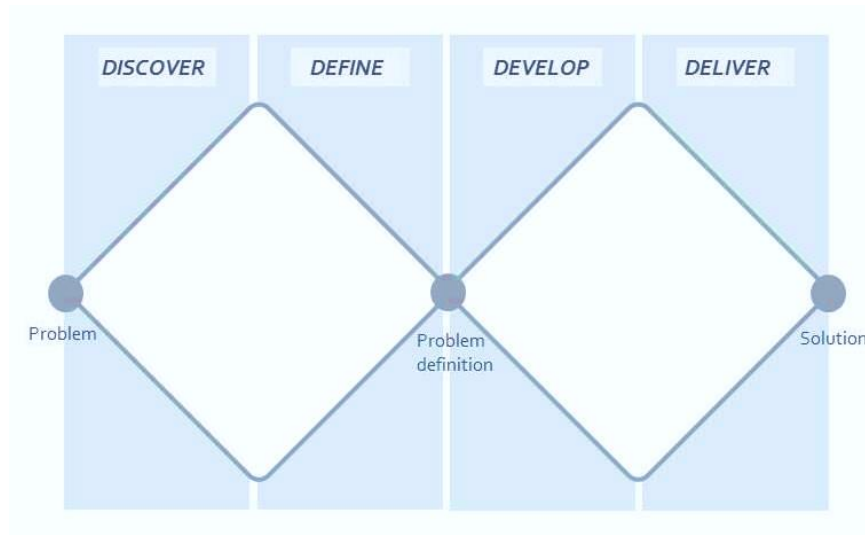


Figure 1: Double Diamond (Designcouncil)

In addition to the common Double Diamond representing four stages of design, it is useful to take advantage of design thinking framework, which can provide context for different design thinking methods and tools. The framework consists of two major phases: identifying problems and solving problems. Even though both phases are crucial, most project teams or people tend to concentrate on the later phase of solving problem. Identifying problem or problem definition is an “analytical sequence” in which design thinkers ascertain all factors of the problems, and decide specifically a list of requirements that the prosperous solution must have.

Meanwhile, solving problems or problem solution is a “synthetic sequence” in which a variety of requirements is integrated and balanced, yielding final solution to tangible outcome (Buchanan, 1992). Accordingly, the power of design thinking stands at its emphasis of identifying the right problem to solve during the first phase. Below is a figure explaining the framework of design thinking:

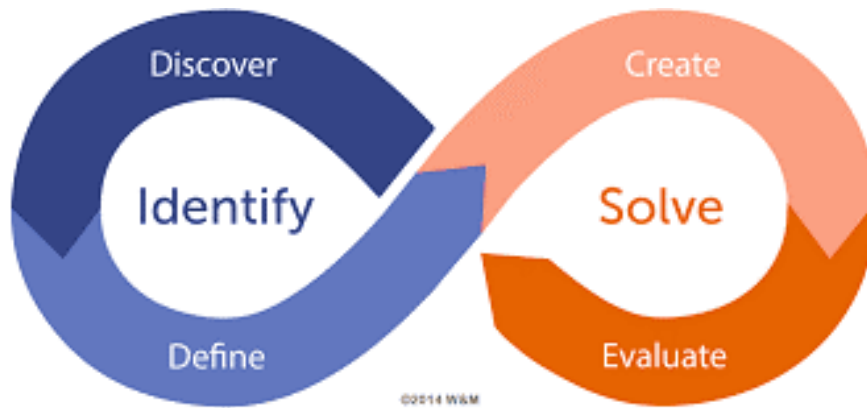


Figure 2: The framework of design thinking (Luchs, Abbie & Scott, 2015, 14.)

The figure expresses four modes of Discover, Define, Create and Evaluate within the framework. The first two modes: Discover and Define help to identify the problem while Create and Evaluate mode help to solve the problem. The framework represents quite comparable mode to the Double Diamond despite of only two actions- Identify and Solve. As shown in the diagram, the process of design thinking can go from Evaluate mode to Discover mode again; and design thinking tools and methods can be organised according to their purposes from the framework (Luchs, Abbie, & Scott, 2015).

This framework is different from the Double Diamond because Double Diamond is a common representative of design thinking process, and the process must be created from a solid frame. The “Discover” and “Define” stage in the Double Diamond correspond with the “Discover” and the “Define” mode from design thinking’s framework; while the “Develop” and “Deliver” stage in the Double Diamond requires the mode of “Create” and “Evaluate” in the framework of design thinking.

#### *Discover mode – answering the question of “What is?”*

Initially, the purpose of Discover mode is to discover new customer insights. Project team is usually immersed in technologies or products; and market information consists of only specific data about current products available. Discover mode; therefore, bring chances for design thinkers to concentrate on unmet, unknown and unarticulated needs of customers through open exploration such as observing, engaging, watching or listening (Mootee, 2013, 66).

Discover mode utilises empathy while taking into consideration different contexts, physical, emotional needs, intentions or motivations of people (Marcus, 2016, 142). This mode helps to synthesise the findings into insights- the powerful discoveries that can tackle the



project; and engaging actual customers into the process is crucial to recognise the deep needs that people do not realise themselves (Batten, 2014, 6).

*Define mode - answering the question of "What if?"*

After getting customer intimacy, which means knowledge of customers, problems and unarticulated needs (Liedtka, Andrew & Bennett, 2013), it is time to activate the Define mode. In contrast to Discover mode, Define mode is characterised by the frame of well-defined problems to solve from specific insights that are already iterated. At this point, synthesised information regarding customers and contexts must be ready; while the challenge is to recognise the worthiest insight to pursue through the next phase.

To do that, it is essential to identify structured design criteria consisting of, for example, goals of design, users' perceptions, physical and functional attributes, and constraints. Structure rather than imagination alone brings result for this mode as according to Larry Keeley of Doblin, innovations almost never fail due to lack of creativity but due to a lack of discipline (Keeley, Pikkell, Quinn, & Walters, 2013). Define mode's result is a comprehensible problem statement determining customers' type, unaddressed needs and insights why a particular need is worth pursuing.

*Create mode – answering the question of "What wow?"*

The third mode- Create mode within the framework takes advantage of the problem statement to generate ideas or develop concepts and then prototype. While developing concepts, design thinkers should remain focused on the insights that are already identified and avoid filtering ideas as these ideas are still nascent and they can be improved. The useful mindset is known as embrace ambiguity by being ok with not knowing concrete outcomes and believing (d.school, 2014) However, to move on to create prototype, the team can choose two to three optimal ideas and generate prototypes. Regarding the purpose of this mode, it is to test the rough prototype with targeted market, gain feedbacks and modify the concepts further.

Even though prototypes are made to be validated by the users (Liedtka & Ogilvie, 2011, 129), what is tested and how it is tested is more vital than the prototype itself because Create mode needs the most natural and honest feedback from real users. The form of prototypes can be in almost any forms such as post-it notes, role play activities, storyboard, gadget or a rough application if the forms provides the best environment to test what design thinkers plan to test in advance. Another feature of Create mode regards both

idea generation and ideas' narrowing while prototyping to find out the "wow" factors that brings value for users. There can be new ideas coming up and the team can test different prototypes themselves before letting real users interact and give comments (Aitisi, 2014, 9).

#### *Evaluate mode - answering the question of "What works?"*

This final mode within design thinking's framework comprises two major activities of sharing prototypes with potential customers, and synthesising feedback collected. To get valuable feedback, it is critical to simulate experience for the users instead of plain presentation. The feedback is then iterated to see what really works and the team can decide on next step whether to improve the solution or to develop other prototypes (Darden, 2015). Synthesising the feedback during this mode is similar to that in the Discover mode; however, the team now have a much more tangible prototype in hands.

Furthermore, if the team is created some "wow" moment during the previous Create mode, it is time to check all the untested assumptions and let users co-create, share opinions or communicate as much as they want. This period is called "exploring unknown possibilities" and design thinking team should be open to learn new things while be ready for unexpected directions (Ogilvie & Liedtka, 2011, 137).

In short, even though the framework presents four modes of design thinking: Discover, Define, Create and Evaluate mode, the process of design thinking is not linear. Design thinking team can choose to turn from Evaluate mode to Create mode again if the feedback for prototypes proves a more efficient solution. Accordingly, choosing a suitable time for mode shifting have affection on the success of a design thinking project. When it comes to Bio-xylitol project written in this thesis, four modes were all taken advantage of; however, another Create and Evaluate mode should be turned on again in order to produce a tangible solution.

### **2.3.2 The process of design thinking in practice**

In the previous part, we analysed design thinking framework, which is the basement for all design thinking's process. Nevertheless, design thinking is not a linear process in practice. In a Design Thinking book of Griffin, Charles, Serdar, Michael and Scott in 2015, design thinking is best considered an iterative problem- solving approach instead of a linear process or a sequence; this part still discovers the process of design thinking. It is necessary to acknowledge and comprehend the framework before grasping the process of design thinking because interpreting the framework can explain why there are divergent process of design thinking available.

Back in 1969, the first formal model of design thinking was created by Nobel Prize laureate Herbert Simon in his book "The Sciences of the Artificial", where he pointed out the importance of design in school of engineer, architecture, business, education, law, medicine; he also emphasised that everyone designs to change "current situations into preferred ones" (Simon, 1969, 111). Simon's model includes seven stages of design thinking: (1) define, (2) research, (3) ideate, (4) prototype, (5) choose, (6) implement, and (7) learn. This first formal model from Simon has largely affected design thinking process model nowadays. In 2006, Kees Dorst argued that this conceptual framework, which was based on rational problem-solving, is still "a dominant paradigm" within the field (Dorst, 2006).

According to Liedtka, in 2015, there are five renowned models of design thinking process in practice, from IDEO, Continuum, Stanford Design school, Rotman business school and Darden business school. How the process is described is different from each other but three core stages can be identified: gathering data about users' needs, generating ideas and testing prototypes. In this theoretical framework, author decided to focus on the process model in practice from Stanford School of design and Darden school of business (Liedtka, 2014, 928). This is because Stanford School of design's model is widely popular in practical world while Darden school of business offered an appealing way to approach with design thinking process, by indicating four stages: What is, what if, what wows, what works (to add to this, the practical model of IDEO is quite similar to the model from Stanford School of design).

The process model of design thinking was created by Hassa Platter, from Institute of Design at Stanford. This process not only records different stages of design thinking as a sequence but also integrate the nonlinear characteristic of design thinking by introducing proper approaching modes. The process guide streamlines any intension for people who have just known about design thinking and supposed that design thinking concerns mainly creativity.

Despite the fact that creativity needs a design logic in a project's approach, design thinking project is not necessarily creative (Armand, 2002, 5). This approach requires more factors such as: appropriate problem formulation, mode shifting at the right time, distinct disciplines and characteristics. To begin with Hassa Platter's model, we examine five modes as shown in the figure below: Empathize mode, Define mode, Ideate mode, Prototype mode and Test Mode.

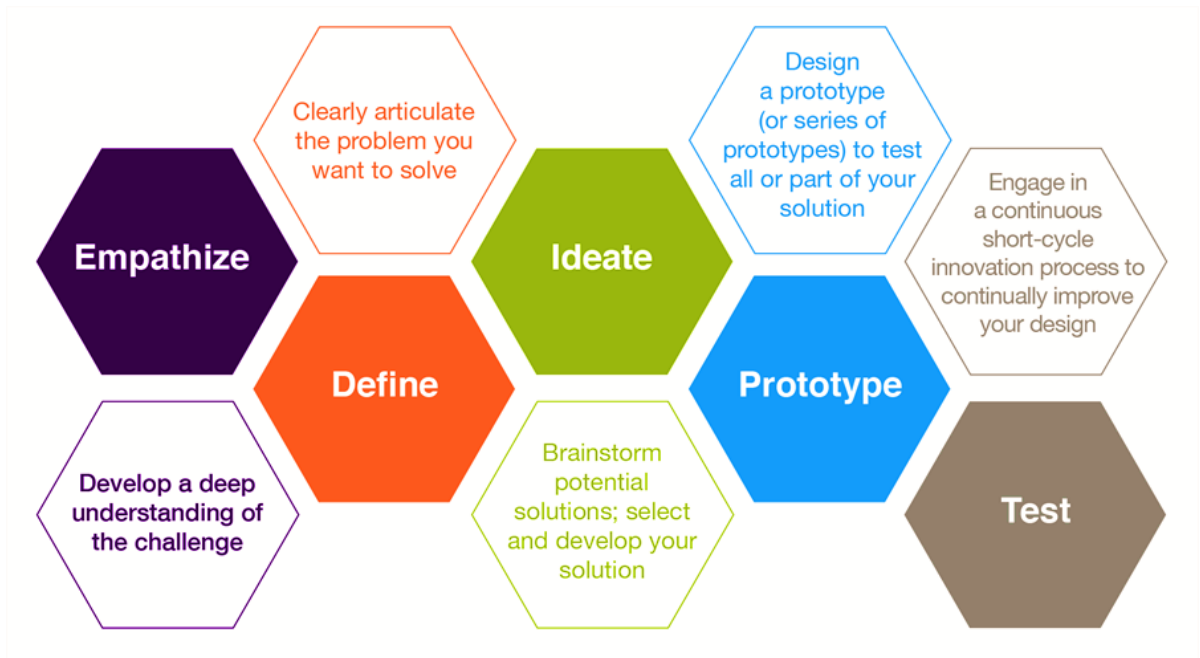


Figure 3: Design process developed by Hasso Platter (citl.edu)

#### *Empathize- Develop a deep understanding of the challenge*

Design thinking process starts with empathy, which is also the centrepiece of a human-centred design process. Empathize mode during the process is similar to Define mode in the framework discussed before. Observation and conversations assist in gaining empathy as viewing users in the context of their daily life releases interesting information. Interviewing users within relevant context, asking them about their motivations, feelings while they have a specific choice can bring new realisations to design thinking team. This kind of interview is more like a conversation based on several prepared questions and the focus is on deep meaning. Hence, design thinkers can get insights from both “short intercept encounters and longer scheduled conversations”, Plattner said.

What users think and what users value is difficult to be discovered by a questionnaire or plain conversation without the context or right environment. For example, asking a user to lead the design thinker through a process within buying context, at user’s workplace or home can prompt practical questions showing intangible meanings and uncovered insights. This method, used during this Empathize mode, was referred by John van Maanen in 1996 as “fieldwork conducted by a single investigator living with and living like those who are studied” usually for a year or more. As a social sciences research method, ethnography should be conducted by researchers’ intensive learnings and totally fresh eyes for empathy (Genzuk, 2003).

### *Define - Clearly articulate the problem you want to solve*

Due to the nature of Empathize mode, Define mode must bring clarity through interpreting the widespread data gathered and narrowing design thinking challenge. Synthesising data can be done by Empathy map in the beginning stage of this Define process. Empathy map is a way to draw out unexpected insights from data in various forms such as notes, audio or videos. Initial step is to draw a four- quadrant layout and then populate the map according to these four following users' traits: (1) say, (2) do, (3) think and (4) feel. The map is used to locate and establish the needs and insights by answering to the question of "What does this tell about users' beliefs or values?" (Stanford d.school, 2009).

After distinguishing some certain patterns, design thinking team can move on designate a transparent problem. Define is especially decisive and critical within design thinking process as it generates POV- point of view statement. Point of view statement illustrates comprehensively and meaningfully the user's type, need and insight. Also, the statement is required to be discrete and actionable enough to frame the design thinking problem, specify focuses and inspire design thinking team. An effective statement can be built by a model of POV Madlib: ...Describe users... needs to ...describe user's need... because ...describe insight... (Interaction-Design).

### *Ideate – Brainstorm potential solutions, select and develop your solutions*

Ideate is about coming up with a large number of possibilities instead of a "right" solution. Transformation from Define to Ideate can be done via brainstorming topics flowing from the POV statement. These aspects are generally sub- topics of the entire challenge; and design thinking team can select several potential aspects; where many captivating ideas can be produced. Because this stage converts from recognising problems to producing ideas, teamwork or diverse stakeholders' involvement is encouraged to explore more unexpected ideas (Hansen & Andreasen, 2008, 110- 119).

To ideate, the team can utilise techniques such as mind- mapping, sketching or even building; meanwhile, surrounding environment is fulfilled with inspiring relevant materials to foster creativity and enrich exciting solutions. As inspiration is key to promote innovative outputs and mutual understandings between team- members, it is recommended that design thinkers should build on others' ideas, avoid judgement and concentrate on a single topic at time (Ambrose & Harris, 2010, 17). A fruitful ideate stage demands separation be-

tween ideas' generation and ideas' evaluation to give spaces for imagination and creativity. At the end, design thinking team can establish particular criteria to vote on some optimal ideas for prototyping phase.

*Prototype – Design a prototype (or series of prototypes) to test all or part of your solution*

Major purpose of this step is to let users interact and experience while they tell about their feelings and feedbacks openly. In the design thinking framework introduced earlier in the report, prototype is also done during Create mode after ideas' generation. Nevertheless, within this process developed by Hassa Platter- Stanford Institute of Design, there are more methods for prototyping such as prototype for empathy or active empathy. Prototypes are built not only to test assumptions but also to empathize with the needs or problems of the users so that design thinkers test these prototypes themselves (Interaction-Design).

For instance, if the users are elderly people, the team can find a very similar situation, apply equipment to create poor eye-vision and start testing the service or product's idea as if all design thinkers were old people. Empathy; therefore, happens naturally and it is suitable time to start prototype to test. Starting with the prototype as soon as possible despite of unsure result and description helps the design thinking process to progress. It is not suggested to spend too much time on a single solution and each prototype must be able to answer specific questions or assumptions recorded in advance (Stanford d.school, 2009, 34).

*Test – Engage in a continuous short cycle innovation process to continually improve your design*

Generally, the most informative results are gained by carefully prepared on how to test the prototypes. This is also an opportunity to study more about both the solution and the users by discovering exactly the reasons behind any interaction. To make the most of the Test mode, design thinking team should stimulate using visualisation such as quick stretch or simple posters; and let users explain their choices visually (Liedtka & Ogilvie, 2011, 142).

A very fancy prototype might make users to think that this is great so that chance for co-creation is lower. Sometimes, test phase shows problems in not only the prototypes but also the POV statement; and design thinking team needs to frame the problem and work

through other steps again. A method to gain more open feedbacks within the team member is using “I like, I wish, What if” to express opinions in a positive way (Stanford d.school, 2009, 44).

What’s more, a productive test phase includes showing, listening, creating experience and comparing. Letting users try a prototype without explaining anything before, watching how they deal with that, listening to their questions, observing anything in the process, taking notes and asking a lot of “why” questions can reveal fascinating insights. For example, it is typical to encourage users to react with the prototype as an experience, and let users interpret everything themselves.

Thus, users should also have chance to compare different prototypes while make comments as comparison usually reveals their unapparent needs. As explained in the previous part, breakthrough innovation tends to result from taking advantage of creative energy and tactic knowledge, which is based majorly on emotional involvement and bodily experiences (Mascitelli, 1999); a wide range of available tools must be ready for users to freely share their thoughts.

*Last but not least*, choosing various options to perform prototypes and testing assumptions is an essential step. Despite of the contemporary technology development, technology should be used as a motivation for imagination, visualisation through users’ feelings. Any technology that neglects people’s emotions cannot acquire actual insights and thoughts (Jamil, Sergio, Armando, & Fernanda, 2015, 93).

Even though the process of design is presented as a consequence with stages, it is essential that design thinkers master the mindset of design thinking and adapt each suggested mode themselves. At the end, design thinking process is not necessarily linear and there are more and more available models having been developed. The common fundamental aspect of these models concentrates on empathy and constant iteration of different data’s forms. Otherwise, each design thinking project should select the most suitable process for the team as Tim Brown, CEO and co-founder of IDEO has expressed that design thinking is a “human-centred approach to innovation that draws from the designer’s toolkit to integrate” people’s needs, technology’s possibilities, and the requirement for business success.

## **2.4 Personas as a designing tool**

During design thinking process, persona is considered a communication tool for designing team. Persona is not only the profile of the users but this tool captures the goals of the users instead of their tasks and helps design thinkers to concentrate on design thinking's goals throughout the process. Building successful personas means a lot to the design thinking project because this is the connection between all data collected, synthesised and the ideas generated. Thesis's project also resulted in building users' personas so that this persona section can explain deeply different contributions of the tool in design thinking. Furthermore, the way to create useful personas and risks of using personas are recognised.

### **2.4.1 Contribution of personas during design thinking process**

During Apple's World-Wide Developers Conference in May 1997, Steve Jobs did express: "You have got to start with the customer experience and work backward to technology". This has been the right attitude towards business development; and an important designing tool during design thinking process concerns personas. Personas, which was one of the most crucial concept of Cooper in 1999, is a model of a user with personality, personal motivations and life-like characteristic (Blomkvist, 2002, 1-2).

Definition of personas was created by Cooper in 1999 as a "precise description of user and what he wishes to accomplish" to create real person in the mind of each design thinker (Cooper, 1999, 123). Personas can represent the patterns of users' goal and behaviours, with fictional description and make terms like "user-friendly", "design for the users" less vague.

Moreover, personas-tool is considered an interaction design technique, which is very popular in not only software product development but also other social or business fields. This tool can engage many members within design thinking team and help people to convey a large amount of qualitative or quantitative data effectively (John & Jonathan, 2000). For example, during brainstorming in ideation phase, personas help people to have better conversation, form empathy and create possible prototypes. If any questions pop up, well-defined personas can bring answers and solutions for the team.

As persona is "a design artefact" intended to be a communication tool, personas tool is vital in impressing specific needs of users. Design thinking team; therefore, can gain common focus during the whole design thinking process. To encourage effective communication and engagement of design thinking team-members, personas can be given specific



name, photo, description to increase its validity (Marshall, 2015). Regarding other stakeholders' communication, personas provide common language with also the developer or manager to build similar commitment and goals with the designers. If any measurement is required during the process, team can always compare the personas and design problems with solutions (Tomasz & Kenneth, 2011, 417-420).

Accordingly, strengths of personas as a designing tool are solving the problem of "elastic users", "edge cases" and "self-referential design". "Elastic users" are the users formed by every single person in a team with his/ her own conception; and while the team is making decisions, the solutions needs to be stretched to fit many needs suggested by everyone. With personas, this problem can be solved from the beginning by bringing common focus on ideal users; and the design solution fulfils crucial goals instead of being a "self-referential design"- reflecting only some developers or designers' goals. Another mistake during design process regards trying to solve all the situations that might be possibly happen or solving the "edge case". Hence, personas act as the checklist for priority and clarity (Cooper, Reimann & Cronin, 2007, 79).

#### **2.4.2 How to create and use personas**

The first step in creating personas is to identify and research users by in-context interviews and real-world observation. As discussed in the empathize mode of Hassa Platter's model before, data used to synthesise personas should be primarily from ethnographic techniques or other types of contextual inquiry (Cooper, Reimann & Cronin, 2007, 81). Ethnographic research is the deep qualitative study of users when they are using a service or product. Ethnography; hence, includes a variety of qualitative methods to observe and interact with users in their native habitat (Liedtka, 2014, 928).

In practice, secondary research can be conducted before contextual interviews. After planning and choosing the users group, the way how interviews are done, design thinkers need to be ready in the empathize mode and start action. It is possible to use records, photos, videos... during the contextual interview with a permission from participants. Meanwhile, observation is essential so that right questions to understand deep reasons behind each choice of users can be asked constantly.

Contextual interviews should be prepared carefully with a focus and adapted flexibly due to responses. In general, design thinkers have in mind what kind of information they look for but if they get important insights, they can try to ask the "why" questions five times until they have deep understandings about the users' reasons. This is called the five why techniques, asking why at least five times through different details' level, to analyse the root

cause (Pojasek, 2000, 79). Also, the statement or behaviours of users observed by this method can be a real value when it comes to sorting patterns and creating personas.

After that, the next step is consolidating data in a workshop with all design thinking team. To support the building of the personas, design thinkers can utilise information from market research data, literature reviews and previous studies as supplemental information but direct observation and contextual interviews can never be replaced. A persona is full when it represents the largest needs, goals and frustrations of users without focusing on a real single person. Kim Goodwin suggested that one or two pages of description about “goals, attitude, environment and a few fictional personal details” can make persona to life. Personal details; however, should be balance with other information instead of being too specific (Goodwin, 2008).

Additionally, Cooper suggested that personas represent the user throughout the design thinking process as the word “users” was not specific enough and different members of the design thinking team might have different views on whom the users are and which goals the user have. If two personas have same goals, they can be merged into one personas; and the reasonable number of personas in a project can range from three to seven (Blomquist & Arvola, 2002).

There are five types of personas: focal, secondary, unimportant, affected and exclusionary personas. Focal personas type describes primary users who are also the focus of design thinking team; there can be more than one focal personas. Secondary personas type uses the designed products or services but the design thinking team will satisfy them if possible. Unimportant personas type can represent infrequent and misusing users; while affected personas type does not use but is affected by the designed products or services (for example, a spouse or children of the real users). Lastly, exclusionary personas categorise people who the design thinking team does not design for (Olsen, 2004, 2).

Even though design thinking process usually involves creating and using personas, personas can fail in several situations: when personas are not seen as credible data; when personas are poorly communicated and when the design thinking team does not use the tools well. Initially, personas must be based on research and despite that some components of the personas are fiction; the personas overall need to reflect believable and realistic insights of the users. Behaviour patterns, together with specific goals and motivations, define a persona; and design thinkers must carefully synthesise data collected during contextual interviews in team (Cooper, Reimann, & Cronin, 2007, 82). The more assumption personas have, the more ineffectual personas are!

Once credible personas are created, they can still fail if the whole team does not review and develop the personas in minds through time. Team should make effort to communicate effectively information inside the personas with each other while the personas are revitalised and refreshed deeply on a frequent basis. Playing a crucial role in design thinking, personas can be planned, edited, matured, continuously developed and reused as a circle based on project process (Pruitt & Adlin, 2006, 40). With the right integration and approach, personas can be created and taken full advantage of by design thinking team as a valuable design thinking tool throughout time.

### 3 Project process, methods and tools

As explained in the previous chapters, the process of design thinking in practice is far from linear; in this chapter, design thinking tools and methods used in the project are described in detail. To present the project's process, figure 5 visualises different stages, methods and tools from choosing, receiving the project to collecting data, analysing data, building personas, prototyping, getting feedbacks and prototyping again.

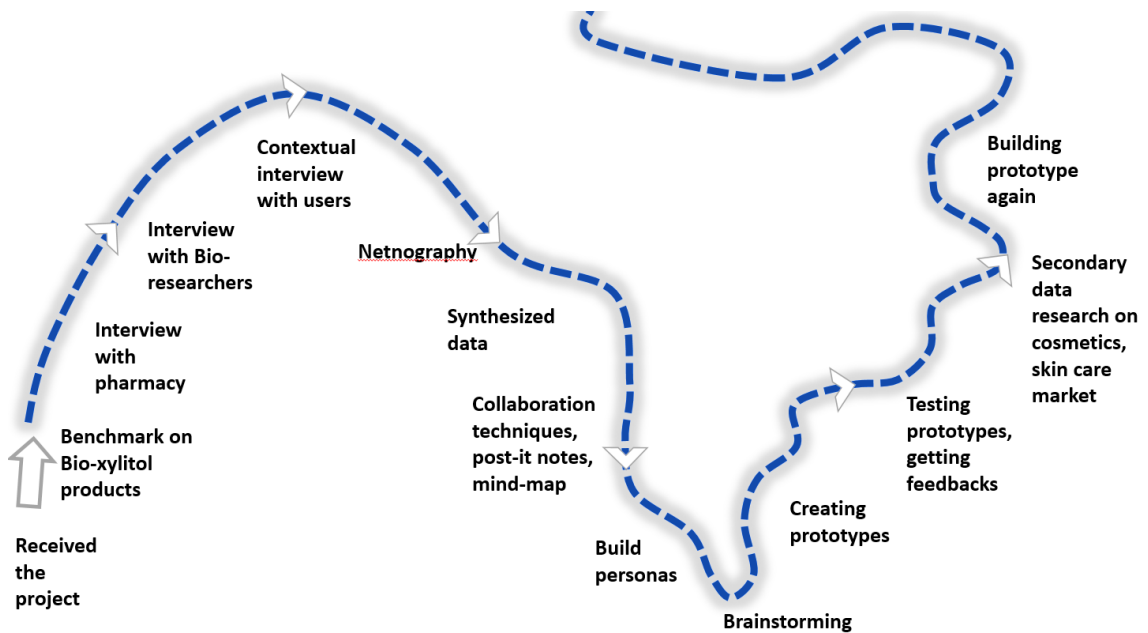


Figure 5: Process visualisation

The figure indicates project's process. Each method is discussed in the later part of this chapter. From the visualisation, different modes can be seen from the design thinking project. *Discover mode* consisted of benchmark, interviews, contextual interviews and online ethnography. Synthesising data, using collaboration techniques, building personas are in the *define mode*; brainstorming, creating prototype is also in the *discover mode* while testing prototypes for feedbacks is in the *evaluate mode*. After that, the process continued with *discover mode* when secondary data was collected; followed by *create mode* when prototype was built again using the feedback collected.

Regarding design thinking tools and methods during the process, the following ones were utilised: benchmarking, personal interview, contextual interview, net-nography, structured collaboration sense-making techniques (mind-map, brainstorm...), personas, prototyping; and secondary data research. Personas as a tool was explained in detail in part 2.4 and its result is presented in chapter 4 of this thesis. Playing an important role in this project, personas tool was the result of data synthesis and the inspiration for prototyping so that it

is part of the theoretical framework. Hence, in this chapter, other methods and tools are described with clarification why they were chosen.

### **3.1 Benchmarking**

This method had been used in the beginning of the project before data was collected from Bio-researchers and users; benchmarking was done online and at the pharmacy in Finland. The benchmarking criteria was to find cosmetics or skin care brand or product which also uses Bio-xylitol as ingredient. Choosing to benchmark at the very beginning of this project, thesis author planned to discover the quality of similar products using Bio-xylitol in current market and how pharmacist or users perceive the products. Some limitations of benchmarking are giving no straight answers to problems or issues.

Otherwise, advantage of benchmarking is to inspire innovative approaches, identify problem and potential improvement (Scott, 2011, 4); hence, learning about an already-on-market skin care product having Bio-xylitol in ingredients is a way to learn about the perception of potential users about Bio-xylitol in cosmetics and skin care products; and how these skin care or cosmetic products are performing (how they are marketed and sold). Benchmarking result explains that Bio-Xylitol cosmetic would be the pioneer in cosmetics and skin care market.

Benchmarking is a way to learn from others' success by continuously evaluating, understanding and comparing to improve performance, develop objectives or establish priorities. Benchmarking is usually done with top brands in the market with clear criteria to benchmark (Xerox corporation, 1979). There are different types of benchmarking such as "reverse engineering" – product oriented benchmarking (Watson, 1994, 5-10), competitive benchmarking or process benchmarking. Regarding its features, benchmarking has for main characteristics of (1) an ongoing process to (2) improve performance by (3) benchmarking against the best and (4) gaining new information. The most crucial feature that has appeared in all definition of benchmarking is performance improvement (Kozak, 2004, 7) as this tool is generally utilised within organisation.

Concerning the process of benchmarking, first step is to determine which area, types and level to benchmark, prepare indicator to measure results, design benchmarking process and implement, review results and communicate recommendations. The focus of this method is not only in the "what to do" but also in "how" to do so that fresh and innovative solutions or ideas can be generated from learning from other success (Meade, 1998, cited by Scott, 2011).

### **3.2 Contextual interview**

In the project, before conducting contextual interview, design thinkers did semi-structured interview with two Bio-researchers at VTT research Centre, Espoo Finland and the purpose is to understand more about possible values that Bio-xylitol cosmetics or skin care products can give to the users. Information from Bio chemical researchers was utilised to establish and shape clear focus for contextual interview.

The context was decided to be inside or near the department stores in Helsinki or in Porvoo, where people choose and buy cosmetics or skin care products. Interviewees are all women; the notes were used to record the data collected, and totally 37 interviews were conducted in both Helsinki and Porvoo, Finland. The focus of contextual interview is (1) to interpret the users in consuming habits regarding cosmetics and skin care products; (2) to understand about them and their motivations by digging into their pains, problems, stories and what they consider values in cosmetics and skin care products. There were several prepared questions or agenda, which is open-ended broad guide to topic issues, to encourage interviewees to tell their stories.

Meanwhile, interviewers flexibly monitored each interview based on the answers, observations and each person so that the interview can be similar to a real conversation, in which if there is crucial information, interviewer can ask more questions. Therefore, in-depth understanding with detail explanation about why 37 women have chosen a decision was collected. Contextual interview agenda can be found in the attachment.

Interview, a tool to interpret people's perceptions, feelings and experiences, can be divided by its degree of structure: structured interview, semi-structure interview and unstructured interviews. Semi-structured interview is more flexible than structured interview because participants have more chances to share deeply about an important topic; and interviewer can adapt the questions according to conversation (Fontana & Frey, 1994, 361-368).

Contextual interview; nevertheless, is generally known as a one-on-one interview within the real-life context. It is a technique in qualitative research as it concentrates on the observation of the interviewees and environment to gather precious field data about how and why people make a decision. During contextual interview, it is vital to let people tell their story, encourage people to continue or share thoughts freely without interruption until there are signals for ending.

Concerning key features of contextual interview, focus, context, partnership and interpretation are essential. This means that before conducting contextual interview, a focus of the information is established with possible subsequent actions. This focus help to determine the people to interview and context for the interview. After that, interviewer should work with participant like in a partnership by creating a shared understanding about interviewer's hypothesis and interviewees' implication in different actions (Karen, Jessamyn, & Shelley, 2005, 80). Contextual interview was chosen as a method because it can release data about what people really think and deep reasons behind people's decision. The context in the interview encourage interviewers to ask useful questions while help interviewees to tell, explain easier.

### 3.3 Netnography

After the contextual interview, netnography was conducted. In this project, netnography was chosen because it can help to discover more opinions and views of users towards cosmetics or skin care products in all over Finland, not only in the capital region. The benefits of netnography concern also greater scale and low cost, while this method has disadvantages of time- consuming and questions on validity. Terms "skin- care products in Finland discussion", "cosmetics products in Finland discussion", "natural cosmetics in Finland discussion" were searched. The reflection from online discussion has helped in building personas and develop the project. Below is a table representing the name of forum, the discussion topic and number of posts that were used in netnography.

Table 1: Netnography source

No.	Name of forum	Discussion topic	Number of posts
1.	Reddit Finland	What are some Finnish beauty products?	7
2.	Finlandforum	What skin care/ cosmetics brands are popular in Finland?	24
3.	Temptalia	From Finland: what's in my make-up bag?	19

The posts included discussion of different people about cosmetics and skin care in Finland. Data found in the forum released people's emotion, feeling, feedback or comments about several cosmetics or skin-care brands. Below is a figure about users' comments on beauty products in Finland from Reddit Finland forum.

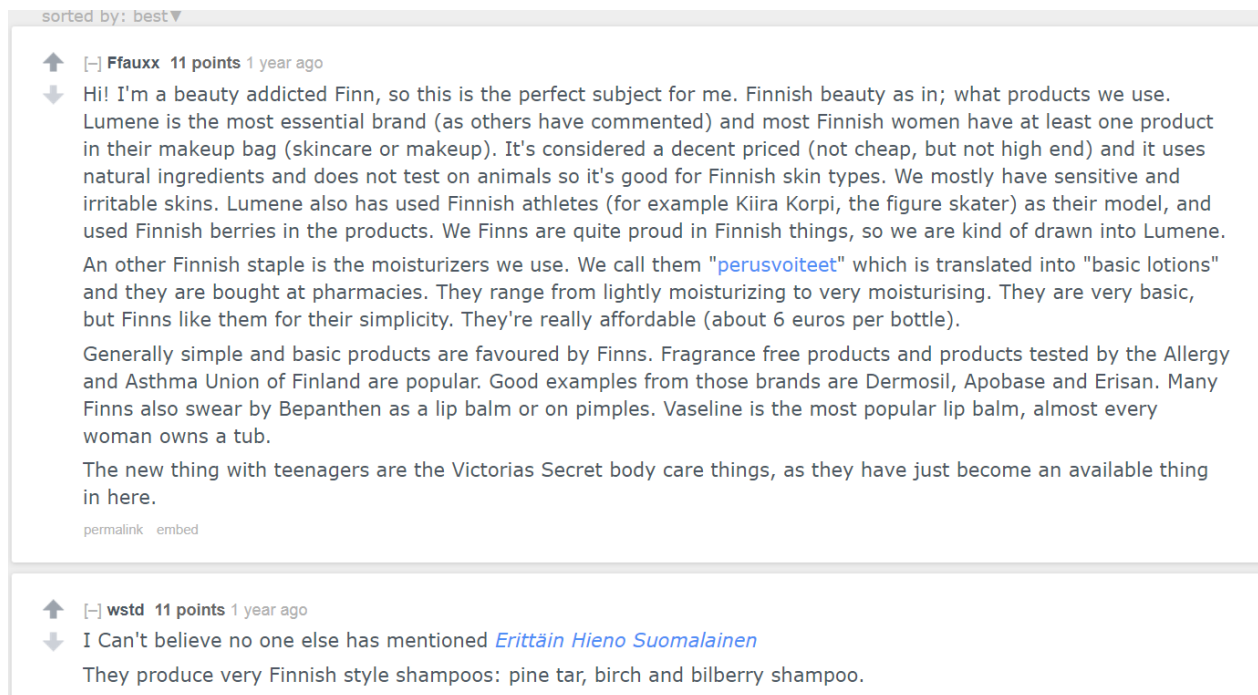


Figure 6: Comments about beauty products in Finland (Redit Finland forum)

There were also complaints or suggestions that people gave to each other. Lumene products were recommended as a popular and good brand for cosmetics and skin care in Finland. However, as key words researched by thesis' author are in English instead of Finnish, netnography result is still narrow.

When it comes to the definition of this method, ethnography is a qualitative methodology involving observation of participants over a period to understand their social interaction, behavior and perception. Its root can be traced back to early 1990s from social researchers. The purpose of ethnography is to provide people's views, opinions and actions (Reeves, Kuper, Hodges, 2008, p. 512). Furthermore, netnography, which means doing ethnography research online, has been popular in marketing and consumer research area; netnography studies the online or "virtual community", discussion or communication, in which people exchange knowledge, share emotion, argue, engage in talks (Kozinets, 2010, 8).

What does it mean by "virtual community"? According to Howard Rheingold in 1993, virtual communities are "social aggregations that emerge from the net when enough people" discuss "long enough" and "with sufficient human feeling". The term "social aggregations" determines that netnography does not concentrate on a single or personal message online but a group discussion such as in a forum. Because the factor of discussion is essential; communication can be done not only via text but also via video or other visual information. To have an efficient netnography, the discussion must be also long; and there



should be enough participants so that there are various human feelings like trustful, supportive, honest (Kozinets, 2010, 9).

### **3.4 Structured collaboration sense-making techniques**

After conducting netnography, it was time to synthesise the data collected by structured collaboration sense-making techniques. Being considered design thinking tools, structure collaboration sense-making technique can help to draw insights from the data collected and create a common mind among team-members (Liedtka, 2014, p. 928). Mind-mapping, brainstorming, concept development tools like business canvas, value proportion canvas were utilised in this project especially during ideate process. Mind-mapping and brainstorming with post-it notes helped during the whole project while business model canvas and value proportion canvas were used to present potential values that Bio-xylitol cosmetics or skin care products can bring to the users. The clear visualisation with separate charts represented the relationship between Bio-xylitol cosmetics or skin care products with customers suitably.

At first, all data was written down in post-it-note and a big board was used to present the data. Similar data was grouped into the same categories and business model canvas with value proportion canvas were taken advantage of to conclude the information.

The business model canvas was chosen as a tool to help analyse the data because it can conclude effectively various aspects of Bio-xylitol cosmetics and skin care products. Regarding business model, it is the pattern of economic activity, which consists of vital structural, operational characteristics of company (Wheelen & Hunger, 2008, cited by (Štefan, Richard, 2014, pp. 19-40); and business model canvas is a strategic management and startup template to develop or document business models including nine key elements of the business's partners, activities, resources, value proposition, customers' relationship, customers' segment, channels, cost structures and revenue stream. Below is the template of business model canvas

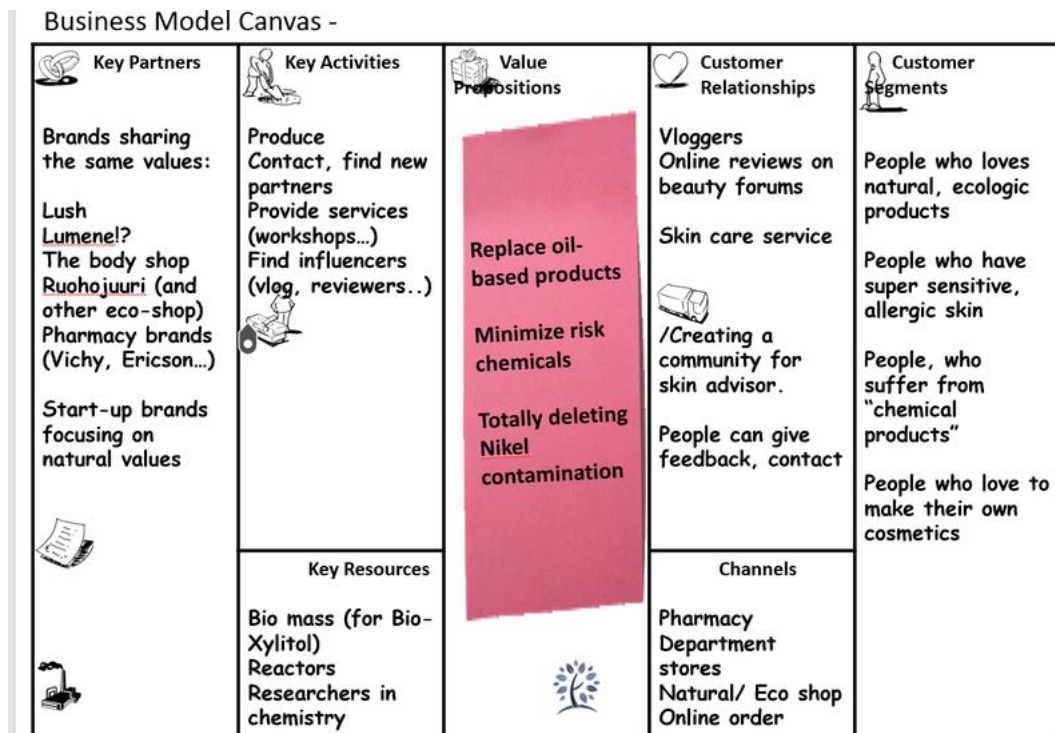


Figure 7: Business model canvas

To support for the business model canvas, value proportion canvas was also used to see the relation between product and users. This tool demonstrates and concludes reasons why users should buy or use Bio-xylitol skin care or cosmetics product according to data collected. It explains pains and gains of the users and show how Bio- xylitol cosmetics or skin care products can become pain reliver or gain creator relatively. The tool was taken advantage of in the project because it could examine the prototypes and explain the prototype for the users to gain feedbacks. The advantage of using these two canvases is an easy and appealing approach to explain prototype to potential users. Below is a template for proportion value canvas.

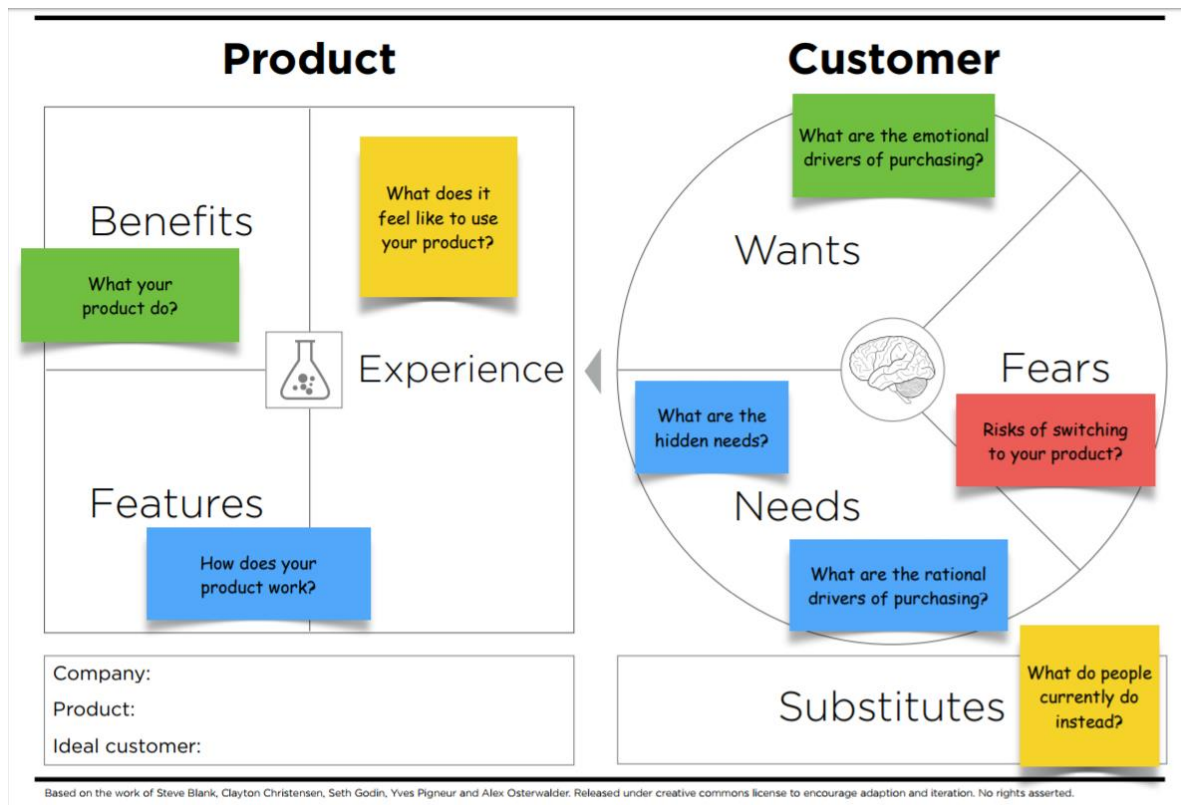


Figure 8: Value proportion canvas (Blank, Christensen, Godin, Pigneur, Osterwalder)

The two canvas, together with the post-it-note in a big board were tools to analysed data and after that, personas were created. In practice, structured collaboration sense-making techniques has been used, updated throughout the project to support the personas and prototypes. Even though only some parts of the business model canvas were used (without the finance- charts), these tools did help to both synthesise and visualise large amount of data collected.

### 3.5 Secondary data research

After the personas were built, different prototypes were created using brainstorming. There were three prototypes including: free skin type test in the pharmacy, make-it-yourself box, and workshop about understanding your skin. These prototypes were given feedback from people joining Innoscout course seminar in Suomenlinna on the 28<sup>th</sup> of April, 2017; however, based on the feedback, only one prototype- Do it yourself box was developed further. In order to make the Do-it-yourself box prototype better, secondary data research was conducted with the purpose to support primary data collected.

Furthermore, secondary data research is flexible and useful because it is an empirical method that can help to support the primary data which is collected by researchers them-

selves (Doolan & Froelicher, 2009 cited by (Johnston, 2014, p. 620)). Additionally, to evaluate the quality, reliability and validity of secondary data, it is essential to consider the time where data was collected together with the reputation, credibility of the source.

Therefore, in the project, secondary data was collected using valid database platform offered by Haaga-Helia University of Applied Sciences library. A world-leading market research provider, Euromonitor international, is the main source for quantitative data regarding skin-care market in Finland. Due to the new market research report published in April, 2017, secondary data brings a functional background information for this design thinking project.

Another relevant bachelor thesis of author Isa Kokoi about “Female Buying Behaviour Related to Facial Skin Care Products” (2011) was used as a source. The study examined buying behaviour of Finnish women (in the age from 20 to 35 years old and from 40 to 60 years old) related to facial skin-care products; and the commissioner was Lumene Oy. This thesis was also chosen as a secondary source of data because the research was a quantitative research assessing factors that affect buying behaviours. This quantitative research can strengthen the nature of qualitative data in the design thinking project.

What’s more, in the thesis of Isa Kokoi, there was data about the use of natural ingredient, facial skin care habits and preferences. Isa Kokoi wrote from the survey that “for many women, no matter if they are young or old, the use of natural ingredients in facial skin care products is not very important.” (Kokoi, 2011, p. 60). It has been around six years from Kokoi’s research; and the thoughts of women consumers have actually changed. Natural ingredients are considered important now. In short, after secondary data research had been conducted, the do-it-yourself box prototype was developed again.

## 4 Project background

The project started from Innoscout course- a service design course organised by lecturer Sirpa Lassila and lecturer Minna-Maari Harmaala at Haaga-Helia University of Applied Sciences in April, 2017. The bio-xylitol project was conducted in team of three (Thanh, Alena, Khanh) and after the course ended, Khanh, also thesis's author, continued with the project. The thesis supervisor is Innoscout course's lecturer Sirpa Lassila, while the commissioner is investigator- Biochemical scientist at VTT Technical Research Centre of Finland. This chapter provides the context for this project, with an overview from cosmetics and skin care products- market in Finland; and introduction about Bio-xylitol production technology.

### 4.1 Overview on cosmetics and skin care market in Finland

Cosmetics and skin care market in Finland is a competitive market with many brands: Garnier, Maybelline, Max X Factor, NYX, Mac, Manhattan, Kiko, Mac, Evelyn, Nivea, Cien, Lumene, Vichy\*, Ericsson, L300, Dr.Hauchka, LUSH, The face shop, L'occitane, Chanel, Dior, Lancome, Clinique, Givenchy, Bonjour, Estee lauder, Vichy\*... However, regarding skin care market only; value sales grew by just 1% last year in 2016. This was contributed to the larger number of affordable advanced products (Euromonitor, 2017).

Moreover, there was several remarkable launches such as a new upper mid-priced line from Lumene; line extensions from other retailers and pharmacies brands. Also, Cien, an awarded-brand from Lidl market has received good feedbacks from the market and consumers. About natural cosmetics, the trend was represented by the launches of small natural cosmetics brands during 2015 and 2016, some brand names are represented in the table 2:

Table 2: Finnish natural cosmetics brand launched in 2015 and 2016

Brand launched	From company
Aisti	KiiltoClean
Puhdas+	New Organics
Flow	Vihreä Kosmetiikka Finland

When it comes to the brand with highest share of retail value sales, L'Oréal Finland remained the leading name with 22% share. The company's share did not decrease much despite of tough economic scene. In 2016, two main launches came from L'Oréal Finland

and Ganier. L'Oréal Finland adapted to the market by launching new products in mass skin care- a line for face mask; while Ganier launched Ganier Respons skin care extension (Euromonitor, 2017). About premium brands in skin care, Lancôme, Biotherm and Vichy were most crucial ones; and they are all from L'Oréal group. Popular skin care products have consisted face and body skin care: face mask, facial cleanser, facial moisturiser, anti-ager, toner, firming/anti-cellulite body care, and other general-purpose body care.

Other big companies in the Finnish market are Berner Ltd, Bodim Port Oy, Lumene Oy and Orkla Care Oy. Berner was established in 1883 by a Finnish family, Berner has renowned brands like XZ- vahva Suomalainen, LV, Clarins, Herbina, Senai, IsaDora, Rimmel... (berner.fi). Bodim Port operates beauty stores, retails, wholesales and distributes cosmetics and various personal care products; The body shop is its famous brand. Lumene, founded in 1970, is a skin care brand believing in the power of nature; the companies have launched different lines since it was established. Lumene has reflected Arctic and Nordic nature concept (lumene.fi). Orkla Care Oy is belonged to Orkla Group and Orkla Care has some brands in personal care such as Blistex, Bliw, Jordan or L300 (OrklaCare.fi). To conclude, table 3 below indicate big companies in Finnish cosmetics and skin care market

Table 3: Big companies in the Finnish cosmetics and skin care market

Popular brands	Company
Lancôme Biotherm Vichy Ganier Maybelline New York NYX L'Oréal La Roche-Posay	L'Oréal group
XZ- vahva Suomalainen LV Clarins Herbina Senai IsaDora Rimmel	Berner Ltd

The body shop	Bodim Port Oy
Lumene	Lumene Oy
Blistex Bliw Jordan L300	Orkla Care Oy

In conclusion, overview of the market in Finland, key trends are the changes in sales channels, the blur between premium and mass products, and the recovery of the market after tough economic situation. The future trends might be that natural products have become the mainstream; and mass brand have challenged premium brands. Also, lines extensions of popular brands might include natural ingredients features. Therefore, the quality of the product should be concentrated on to develop as there is insignificant price pressure (Euromonitor, 2017).

#### **4.2 Introduction to Bio- xylitol technology**

Bio- xylitol production technology has been developed by Biochemical researchers at VTT Technical Research Centre of Finland. Xylitol, mainly used as sweeteners, is produced by a traditional chemical method; and the new Biochemical production technology has several benefits over the traditional one. The traditional way of producing Xylitol comes from biomass streams (e.g. Sulphite spent liquor) with Nickel catalyst at high temperatures.

Meanwhile, the biochemical process starts from Xylose, reduces a single step, and uses microbe yeast to produce Xylitol. In comparison with the chemical production, Biochemical process of producing Xylitol contains no nickel contamination with lower temperature and there is no need to use hydrogen. Accordingly, if Xylitol is produced in large amount, there is significant advantages in cost and energy. Nickel contamination might cause allergy to people so that using Biochemical Xylitol production can help in reducing the risk in final products (Penttilä, 2014).

Concerning applications of Biochemical Xylitol production technology, it can replace the traditional chemical method of producing Xylitol. This Bio- Xylitol can be applied in beauty and personal care industry, be ingredients in various products such as shampoo, cosmetics, skin- care products, toilet paper... Due to the process's benefits, there is lower risk of allergy towards consumers, companies can save money on energy, and the process is more environmental- friendly (Linnekoski, 2017).

The thesis's project concentrated on only application of Bio-xylitol production technology in cosmetics and skin care market as Bio-Xylitol-based products, in comparison with oil-based products, bring chances for industrial innovation. The project started from Innoscout course- a service design course organised by lecturer Sirpa Lassila and lecturer Minna-Maari Harmaala at Haaga-Helia University of Applied Sciences in April, 2017. The bio-xylitol project was conducted in team of three (Thanh, Alena, Khanh) and after the course ended, Khanh, also thesis's author, continued with the project. The thesis supervisor is Innoscout course's lecturer Sirpa Lassila, while the commissioner is investigator- Biochemical scientist at VTT Technical Research Centre of Finland.



## 5 Results

As personas help the whole design thinking process to focus on the goals and motivations of the users, personas are used to articulate user population (Blomkvist, 2002, 7). In this project, three personas were created and named respectively: the nature lover personas, the beauty queen personas and the hand-maker personas. This chapter indicates three personas with different goals and frustrations, and also explains about the prototypes Mix-it-yourself-box as a result of the project.

### 5.1 The nature lover persona

Each persona is described with basic information, life style, goals, fears and frustrations, with behaviour when buying cosmetics or skin care products. Basic information includes persona's name and a representative quote. The quotes come from the data of contextual interview. Below is the description and detailed explanation of the nature lover persona.

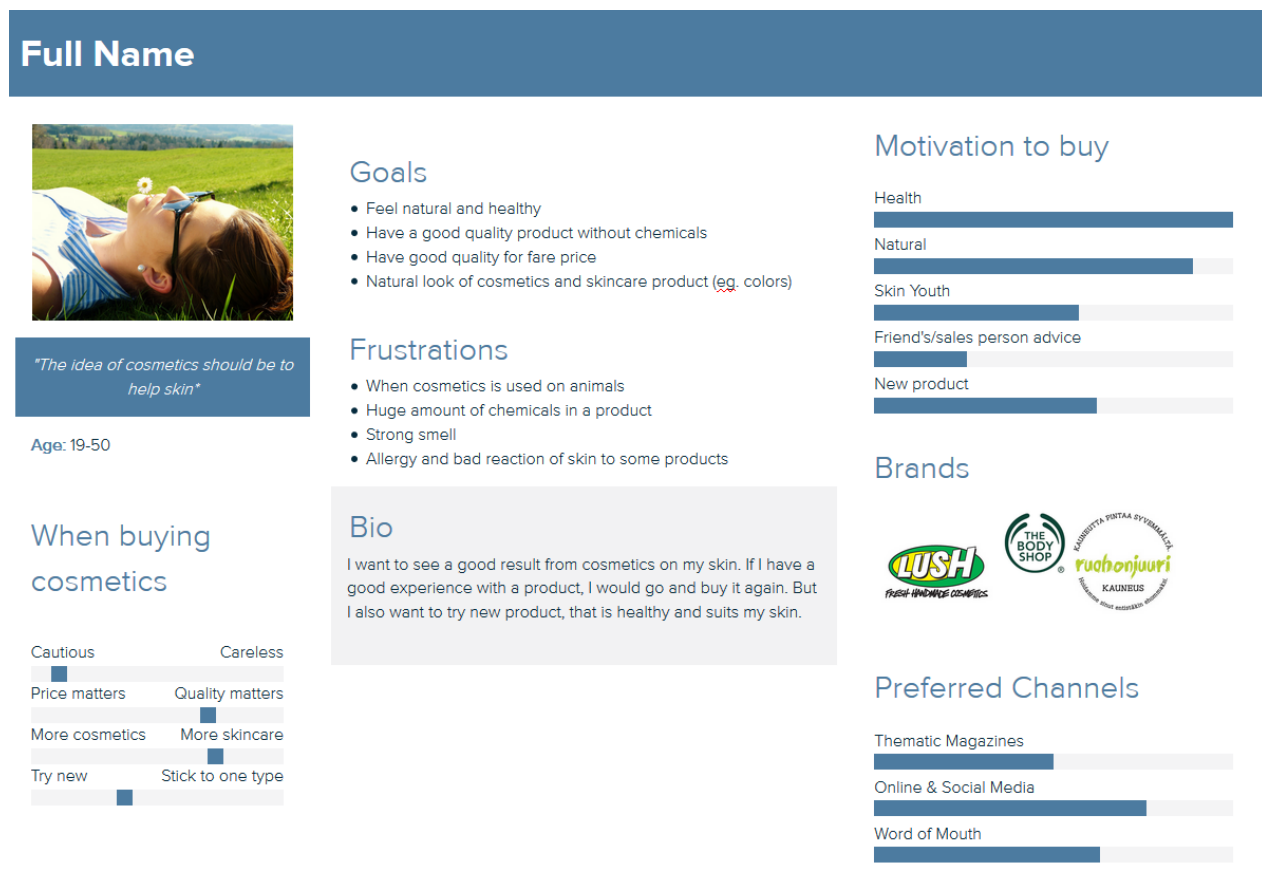


Figure 9: The nature lover persona

*Basic information:*

Name: Mary

Quote: "The idea of cosmetics is to help our skin"

#### *Life-style:*

Mary lives an ecological life so that she uses only organic products from Luomu shop. She uses cosmetics only in special occasions.

She often visits Ruohojuuri store, her favorite place, to buy personal care products like shampoo, cream and some foods.

She is interested in handmade cosmetics and skin care brand such as Lush. She wishes that supermarket or general store would have a wider range of organic products that she could choose from.

As a nature-lover, Mary is motivated by natural ingredients, by environment-friendly impacts and visual benefits on her skin. She always trusts natural ingredients and loves to live a healthy life.

#### *Goals*

Mary wants to use cosmetics or skin care products to help her skin.

Mary takes good care of her health, body and skin.

The feeling that cosmetics or skin care products bring to Mary is crucial as she wants to feel natural, fresh, calm and grounded.

#### *Fears and frustrations:*

Because Mary cares about her skin a lot, she is sad when she gets allergic reactions or spots on the skin.

Mary has sensitive skin and understand her skin well. She knows which type of skin she has so that she does not like cosmetics or skin care products with chemical color or strong smell.

Mary hates products tested on the animals; and she requires the brand to care for both her skin and Mother Earth.

#### *Behavior when buying cosmetics or skin care products:*

As Mary has a sensitive skin, she is cautious to try new products at first.

However, if her friends or family members tell about a natural, effective, environment-friendly product, she is willing to give it a try.

Mary keeps buying, using and recommending the products if she likes the products.

The first persona wants to feel good and familiar when it comes to buying a cosmetics or skin care product. To feel good, the cosmetics or skin care products must be environmental- friendly while the ingredients are natural, ecological and organic. "I quit if it was tested

on animals”, “there should be no animal testing” are some quotes to express how important it is for the brand to be animal- friendly. A brand which is promoting that it is against testing on all animals encourages this persona to get to know the products. This persona stops buying and tells friends if any products are tested on animals. Moreover, products attracted to this persona can bring good feeling by paying back to the society, taking care of the Earth and environment by different projects.

## 5.2 The beauty queen persona

The second persona is the beauty queen persona. In comparison with the nature lover persona, beauty queen persona does not care much about organic products, expressing worries regarding using natural or organic cosmetics products by indicating that “Natural cosmetics might not last long” and “Cosmetics for eyes must be waterproof”. Additionally, beauty queen persona believes that ““Cheap cosmetics are bad to the skin”, and beauty queen persona wants to use safe cosmetics and skin care products. This is quite similar to the nature lover persona because nature lover persona also requires safe products. However, if nature lover persona prefers totally organic ingredients, beauty queen person just wants to make sure that the cosmetics or skin care products do not contain dangerous ingredients or harmful chemicals.

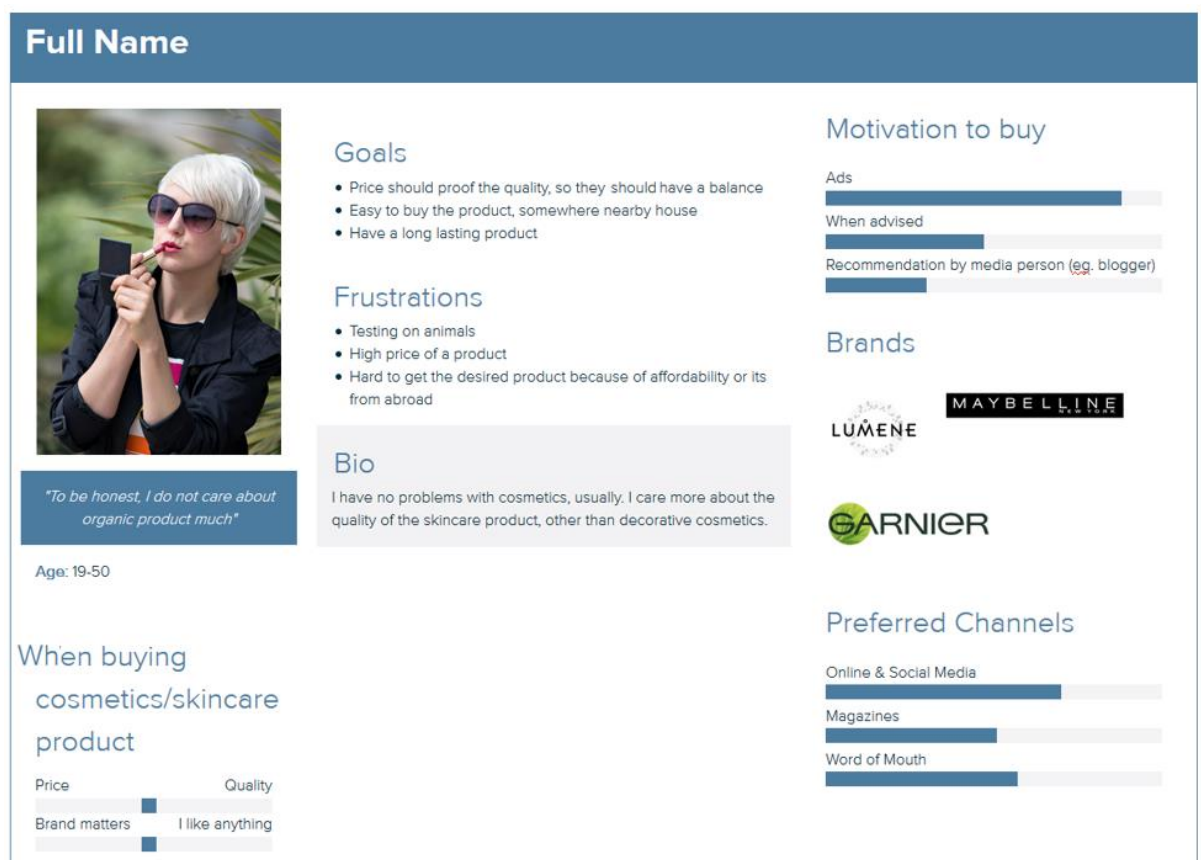


Figure 10: The beauty queen persona

*Basic information:*

Name: Anna

Quote: "To be honest, I do not care much about organic products"

*Life style:*

Her image to other people is important to Anna in everyday life.

Anna pays when she believes the products are worth the money and her skin can benefit.

As Anna is busy, she values her time and convenience.

She demands visible results after using the cosmetics or skin care product.

Hence, she thinks organic products are nice while wonders whether these organic cosmetics can last as long as her Maybelline mascara.

*Goals:*

Anna loves to be beautiful every day and she values convenience in her life.

She usually has preference regarding her favourite brands or products.

Anna uses both cosmetics and skin care products.

She does not want to try a new product or brand because what she has used is good to her.

To Anna, convenience in life is vital so that she does not spend much time choosing from various choices.

*Fears and frustrations:*

Anna is sad when she needs to do makeup again many times in a day. She loves to make sure that her mascara or eyeliner are waterproof and the cosmetics she applies can last long.

Anna is frustrated if it takes long time or huge effort for her to buy the products she needs. She is also sad if the products are tested on animals or if the products cost too much.

*Behaviors when buying cosmetics or skin care products:*

Anna does not want to experiment new cosmetics or skin care products.

She uses what she believes to be suitable for her skin.

Anna thinks that organic products must be good to other people but she is satisfied with her current choice.

She might go to any department stores or supermarkets where she can conveniently go shopping.

It is essential to remember that both the nature lover persona and the beauty queen persona are frustrated by products tested on the animals. Meanwhile, beauty queen persona

determines the quality and safety of cosmetics products by the feeling when applying, saying that: “When I apply, I do not want my skin to feel dry”. If a product causes some spots or allergy, beauty queen persona considers the product bad for the skin.

### 5.3 The do-it-myself persona

Last persona is the do-it-myself persona, expressing that “I do my own mask from Aloe Vera”, “I use sea salt to wash face, olive oil to moisture hair and use natural shampoo”. Do-it-myself persona just enjoys and prefers to make own products at home because these every day-life ingredient can help skin. Do-it-yourself likes sharing with friends and family about the tips, for example, about the benefits of washing face by only sea salt.

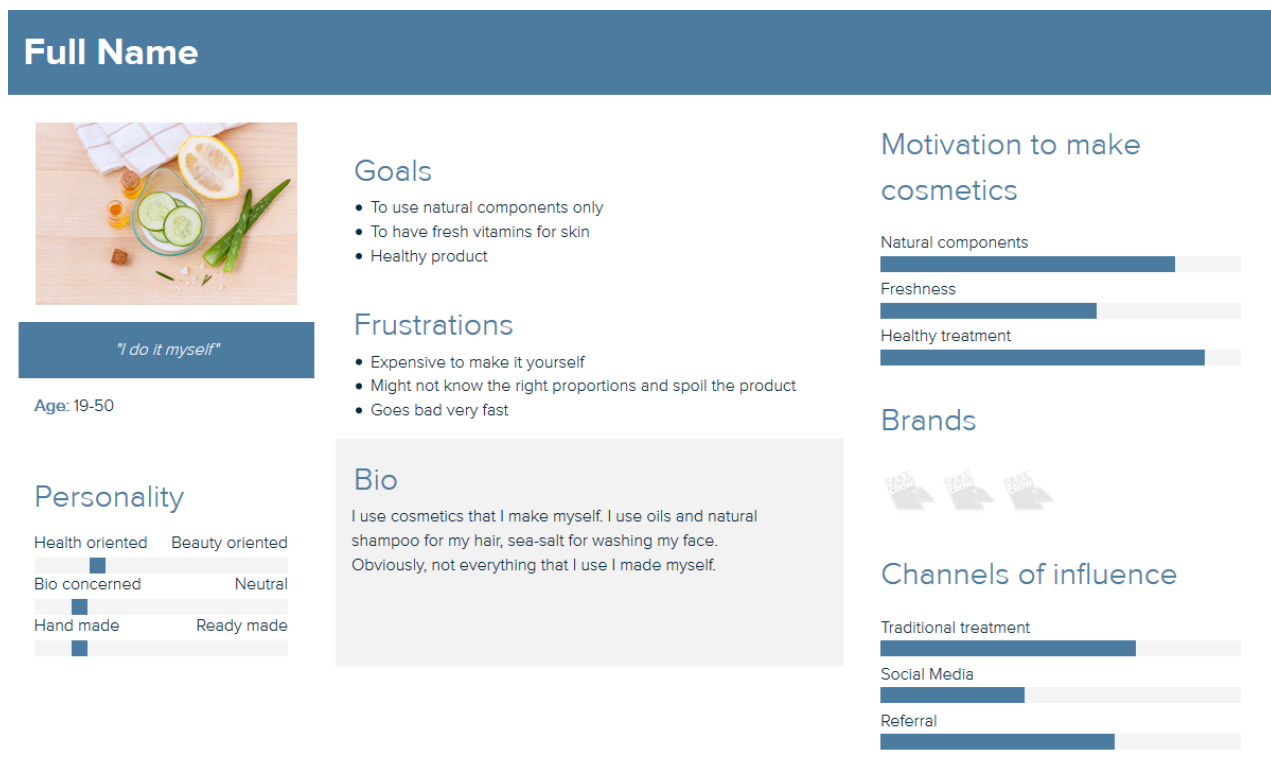


Figure 11: Do-it-myself persona

#### *Basic information:*

Name: Kate

Quote: “I prefer do it myself”

#### *Life style:*

Kate has a young and energetic mind, she enjoys spending time with friends and she really loves discovering new natural ingredients.

Some of her tips include using sea salt to wash face, reduce spots and using olive oil to moisture for hair and skin.

To Kate, coconut, natural oil and herbs are rich in vitamins for skin.

*Goals and values:*

Kate values totally pure and natural skin care products.

She is not a fan of cosmetics at all.

She has just started to make different skin care products herself by hearing tips from her friends.

After that, she fell in love with the positive and fresh feeling that Do-It-Yourself process brings to her.

Kate used to suffer from cosmetics before as her skin is highly sensitive.

Therefore, she is motivated by keeping her skin healthy, finding new recipes for hand-made personal care products.

*Fears and frustrations:*

She hates when she gets bad reactions or her handmade personal care products cannot last for long time.

When she makes a larger amount of handmade skin care product than she needs, she wastes and she is not happy.

Sometimes, she is frustrated when it is difficult to find a specific ingredient. It is also expensive and inconvenient for her to buy a variety of ingredients.

*Behaviors when buying cosmetics or skin care products:*

Kate still buys several basic skin care products such as toner, lip balm, cream for dry skin and Vaseline.

She buys from online websites, markets, department stores or receives products as gifts from friends or family.

She believes in recommendations from friends and trustful online sources such as a vlogger she follows.

Being different from the nature lover persona, who wants to use organic cosmetics or skin care products, do-it-myself persona does not buy many cosmetics or skin care products. This do-it-myself persona uses only some products such as basic lotions or “perusvoiteet” in Finnish, toner, lip balm or Vaseline. Furthermore, do-it-myself persona tends to suffer from bad skin problem before, telling story about using lots of cosmetics two years ago, and currently using only hand-made skin care products at home. In short, these three personas reflect the population of cosmetics and skin care users, especially different users’ goals and frustrations. However, persona is a design thinking tool instead of the market segmentation (Olsen, 2004, pp. 2-18). As explained in the theoretical framework, part 2.4,

there are several types of personas. The do-it-yourself is the focal persona which the prototype was designed for, while the nature lover persona is secondary persona which the prototype will satisfy if possible.

#### **5.4 Previous prototypes and the Mix-it-yourself box**

As described in the project's process chapter, data synthesis and personas were utilised and reviewed during the step of creating prototypes. As design thinkers have ability to visualise, the ideas are presented to users by low-fidelity prototyping, which was a form of sketching and showing via visualisation. There were three prototypes of free skin type test, ingredient workshop event, and Mixing box to utilise Bio-xylitol technology in cosmetics and skin care products. Ideas about spreading the words and using special labels for products produced with Bio-xylitol technology were also generated. However, during the seminar of Service design- Innoscout spring 2017 course, feedbacks for all prototypes were collected. Among all prototypes brainstormed; Mixing box prototype received positive feedbacks and ideas. That single prototype was selected to develop further into the Mix-it-yourself box.

In addition, the prototyping and testing stage was crucial during design thinking project as Time Brown indicated before: "By taking the time to prototype our ideas, we avoid costly mistakes such as becoming too complex too early and sticking with a weak idea for too long." (InteractionDesign). Before the Mix-it-yourself box prototype is described, below are all the ideas and prototypes developed during the process. After that, Mix-it-yourself box prototype is examined further to see how this specific prototype meets the needs and solves problems of the focal persona – the do-it-myself persona presented in the previous part.

The first prototype is the free skin type test. This free skin type test prototype provides the code for all the pharmacy. By scanning the code, people can get access to a short test about their skin type and suggestion on how to take care of the skin. The test result also includes graphics about Bio-xylitol based and oil-based cosmetics/ skin care products. The purpose is to bring a useful and easy-to-follow step of step process for people to take care for the skin while introduce about Bio-xylitol based cosmetics and skin care products.



“Skin care test” - Scan the code - available at pharmacy

- Scan the code
- Short skin type test appear (around 5 questions)
- Results
- Daily timetable to care that skin type (by pictures, with products, steps, time)
- Graphics to indicate differences between Bio-xylitol based products and oil-based products

Figure 12: Free skin type test prototype


Another prototype is the ingredient workshop, where people can come and learn about cosmetics/ skin care products' ingredient. There is information on the cosmetics or skin care products' packages but knowing how to read the ingredient is still mysterious to many consumers. The workshop is also a place to gather beauty vloggers and share the advantage of Bio-xylitol based products.




**Raising awareness/ knowledge of people about advantages of bio-xylitol based over oil-based cosmetics:**

- **At Luomu/ organic magazines, events**
- **Creating workshops/ competitions after that regarding knowledge about why bio-xylitol is much better than oil-based products**

**Tuomon Luomu - Events | Facebook**   
[https://www.facebook.com/TuomonLuomu/events/?ref=page\\_internal](https://www.facebook.com/TuomonLuomu/events/?ref=page_internal)  
 ★★★★★ Rating: 4.3 - 35 votes  
 Tuomon Luomu, Kuusankoski. 1546 likes · 2 talking about this · 72 were here. Tuomon Luomun tuotemyynti on siirtynyt Cafe Ruukittareen Taideruukiin...

**Kalliolan luomu - Events | Facebook**   
[https://www.facebook.com/kalliolanluomu/events/?ref=page\\_internal](https://www.facebook.com/kalliolanluomu/events/?ref=page_internal)  
 ★★★★★ Rating: 4.6 - 7 votes  
 Kalliolan luomu, Nykälä, Itä-Suomen Lääni, Finland. 651 likes · 4 talking about this · 9 were here. Tervetuloa luomuvihannesten maukkaaseen maailmaan...

**Ruukin luomu- ja lähituotemarkkinat - Events | Facebook**   
[https://www.facebook.com/luomumarkkinat/events/?ref=page\\_internal](https://www.facebook.com/luomumarkkinat/events/?ref=page_internal)  
 Ruukin luomu- ja lähituotemarkkinat, Ruukki, Oulun Lääni, Finland. 538 likes · 2 talking about this · 13 were here. Pohjois-Suomen ainoat luomumarkkinat...

**Lähirooka & luomu 2017 | Messukeskus**   
[messukeskus.com/event/local-organic-food-fair-2017/?lang=en](https://www.facebook.com/event/local-organic-food-fair-2017/?lang=en) Translate this page  
 1 post(s) Mr Messukeskus · Published 26.1.2017. Lähirooka & luomu 2017. A public event focusing on local and organic food. More on the topic...





# Workshop ideas

## Ingredients workshops

- Identify types of oil-based ingredients in cosmetics products
- How to read ingredients of cosmetics (types of good/ bad ingredients)

## Process workshops

- General process of producing cosmetics  
(make it fun by letting people work on it from some clues/ picture)
- Interesting facts about the process (what makes it good/ bad)
- Own cosmetics? Suggestions, ideas workshop



Then spread the words/ ideas/ benefits of bio-xylitol cosmetics... with fact that currently most cosmetics are oil-based → make it like a campaign on social webs, likes, shares...

Figure 13: Ingredient workshop

These two first prototype were not chosen to develop further because the mixing box prototype received quite high interest level. The initial version of the mixing box prototype was very simple as shown in figure 13.



## A BOX

- Educational box/ bio-xylitol box for mixing some cosmetics together with bio-xylitol
- With a small knowledge book of Bio-xylitol based products and its benefits



Figure 13: Initial version of Mix-it-yourself box prototype

However, as we can see from figure 14 below, the prototype is very different from its initial version. The idea of a small book was kept but the book's content was updated; mixing and measuring tools with ready ingredients were also added.

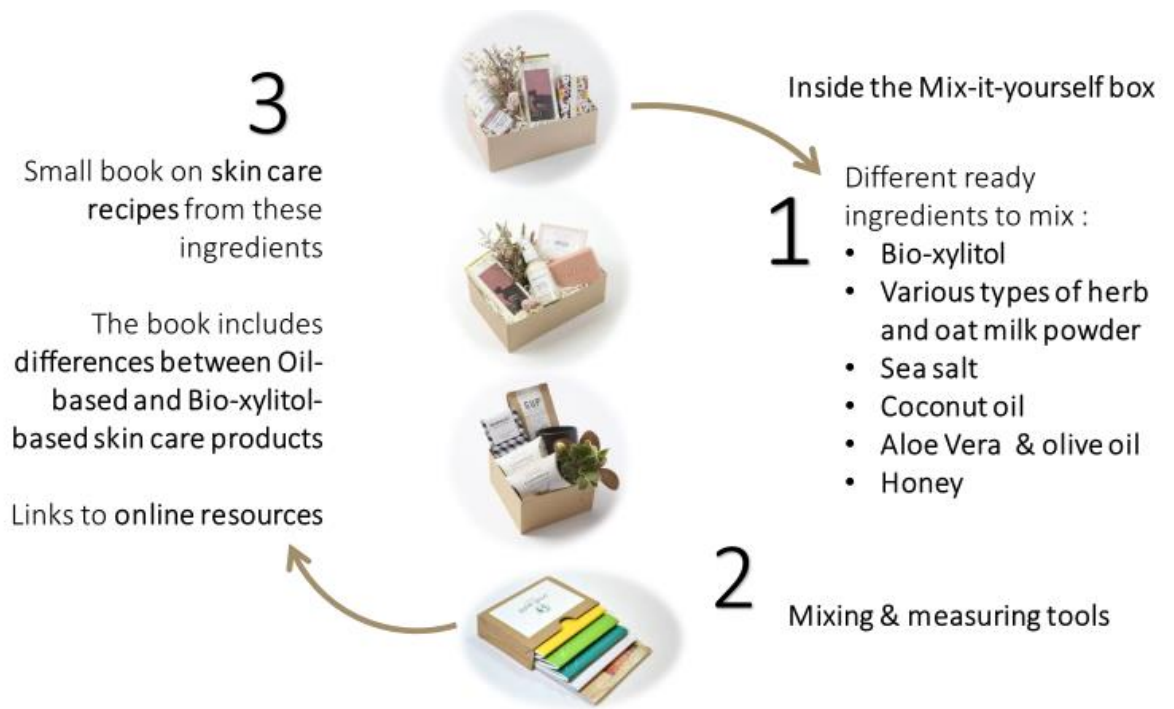


Figure 12: Mix-it-yourself box prototype

The Mix-it-yourself box fulfils the goals of focal persona by providing pure and natural ingredients in the same box. All ingredients are organic products from a trade fair certified supplier. Additionally, the box solves the problems of not knowing the right amount of ingredients or wasting ingredients of the focal personas. With measuring and mixing tools and a variety of skin care recipe represented by the approach of “Show it, don’t tell it”; users can mix, use while know about benefits of Bio-xylitol at the same time. Focal persona is frustrated by spending too much money on making skin care product themselves; accordingly, this mix-it-yourself box offers a convenient, functional but economical way to do your own natural skin care products.

These ingredients chosen are favoured preferences of the focal personas. Because the box is different by Bio-xylitol, the first and foremost ingredients must be Bio-xylitol, following are herb powder, oat powder, sea salt, honey, coconut oil, olive oil and Aloe Vera. Even though the prototype was designed to directly fulfil and help the focal persona (Do-it-myself persona), secondary persona (Nature lover persona) can also benefit from the natural and organic ingredients. It is possible for the prototype to serve secondary persona; therefore, all ingredients’ suppliers are environmental-friendly while all recipes are not testes by animals.

Concerning a small book/ guide inside this box, a variety of recipes solves the problem of not knowing many ways to care for the skin. The guide also consists of skin care

knowledge, advantages of Bio-xylitol based skin care products over oil-based ones. “I like it when I know what I put inside the skin care product” was a useful feedback to develop this prototype. The prototype used to have right amount of ingredient so that users only needed to add and mix all ingredients together. However, after getting the feedback from users, I decided to add measuring tool to the box. This increases the feeling of measuring, mixing, doing yourself; and motivates people more than just adding everything together.

When it comes to online resources, visualisation should be totally utilised. For example, differences between Bio-xylitol based and oil-based cosmetics or skin care products can be explained by a visual storyboard, by videos or vlogs instead of writing materials. Users said during the contextual interview that: “I do not understand the ingredient list” and “I do not read all ingredients” but considered long list of chemical names are not natural.

Hence, the explanation or visualisation from online resource should be appealing, easy to follow, understand and interact, such as a new recipe visualisation. In short, this updated version of Mix-it-yourself box prototype fulfils the needs and goals of both focal and secondary personas while concentrates more on problems of focal personas. The prototype was built by letting the focal persona be the centre; so that the result, the mix-it-yourself box, was developed much further than its initial version.

## 6 Discussion

### 6.1 Discussion and limitations of the design thinking project

In the book: “The design of business”, Martin mentioned and emphasised the balance between validity and reliability for a design thinker many times. The language of both reliability and validity has also been a controversial argument within design thinking. Analytical thinkers concentrate on proof, certainty, analysis while intuitive thinkers concentrate on opposite factors (Martin, 2009, 171). In this project, the process was not linear, the prototypes were changed several times and the final prototype based on data synthesis was not proved by any exact statistics or practices.

Therefore, the result might not satisfy these analytical thinkers. Also, as a Biochemical researcher looking for approaches to commercialise Bio-xylitol technology, it is challenging for the commissioner to utilise the prototype immediately. To continue developing the prototype, concrete recipes to mix Bio-xylitol based skin care products are required; and the ideate stage should last until a tangible Mix-it-yourself box is created in real life.

Furthermore, design thinking’s result was discussed to be a confusion and breakdown communication without intelligent practice to turn innovative ideas into concrete embodiment (Buchanan, 1992, pp. 5-21); is it wise to choose design thinking approach, which demands constant interaction between design thinkers for a bachelor thesis?

Even though the suitability of design thinking for wicked problems was described in the theoretical framework, the project would be more effective if there were many design thinkers working together from the beginning to the end. In term of presenting final prototype, the communication by sketching and showing did not encourage users to actually interact with the prototype and give any comment. Meanwhile, real interaction plays a vital role in not only the whole design thinking process but also in prototype- testing stage.

Another limitation of the project comes from design thinking approach itself. The design thinking process used in this thesis’ s theoretical framework has been criticised to be oversimplified with ready to use process. Kees Dorst in 2011 emphasised that “the eagerness to adopt and apply” design thinking practices in various fields has demanded definite knowledge and clear frame. This is a problem for the design research community that “has been shy of oversimplifying” study’s objects, and appreciate rich pictures with diverse perspectives; (cited by (Rossi, 2015)).

Thus, the clear cycle, modes and tools from Tim Brown in 2008; Roger Martin in 2009 and Jeanne Liedtka in 2014 were said to be written in a narrative, anecdotal way that was based mainly on case studies rather than academic conventions. Is it possible to put design thinking in a simple package with tools rather than consider the long tradition of design research and numerous discourses? (Sköldbberg, Woodilla, & Çetinkaya, 2013, 121-146)

On the other hand, thesis result fulfilled the aims and questions of the project by finding out current cosmetics and skin care market in Finland; and suggesting approaches to commercialise Bio-xylitol technology by using insights from the users. For future research, it is applicable to continue enhancing the prototype by building and researching on recipes, setting up online resources regarding information about Bio-xylitol based products.

## **6.2 Closing thoughts, key suggestions and personal learnings**

This design thinking project led to a suggestion that Bio- Xylitol production technology should be developed to serve primarily the focal persona: do-it-yourself persona and if possible to also serve secondary persona: nature lover persona. In addition, as users do not acknowledge the differences between oil-based and Bio-xylitol based cosmetics and skin care products, it is essential to raise the awareness. An approach to do so is to continue developing, enhancing and testing a tangible prototype of Mix-it-yourself box by working on building the cosmetics or skin care recipes with online interactive knowledge resource.

A useful source for building the recipe can be a bachelor thesis named “Horticultural By-products in Finland for Potential Use as Cosmetics Ingredients” by Svenja Schneider and Irene Karlstedt in 2016 because the result suggested promising natural fruits and vegetables ingredients for cosmetics products. Another interesting insight is the article: “Ten Simple Rules To Commercialise Scientific Research” by Letcher AC, Bourne PE in 2012. The differences between driven for business and driven for science are explained with helpful rules on commercialising a scientific result.

Otherwise, to the thesis’s author, it is very interesting to discover commercialising chance of an invented Bio chemical technology, to know about cosmetics and skin care market in Finland, to interact, understand and design solutions for the users. This thesis; hence, was a great chance to gain more functional knowledge while practicing all skills and tools gathered from studies and experiences of the thesis writer. Despite of obstacles in developing a tangible prototype, not understanding well about Bio chemical production technology, and communication with stakeholders from diverse backgrounds, the design thinking

project found suitable solutions and insights to help principal researchers and scientist at VTT Technical Research Centre of Finland. The personas and information about cosmetics and skin care market are valuable to the researchers and scientist team.

Even though the thesis author has always been interested in service design and design thinking during the studies and different projects at Haaga-Helia University of Applied Sciences, thesis writing process brought thorough knowledge, practices and experiences regarding design thinking. Having read and researched intensively about design thinking and designing research's relevant topics, thesis's author adopted a stronger mindset concerning the field by practicing and interacting during project's process. In addition, knowledge about cosmetics and skin care market was gained while communication skills were enhanced in various aspects. As the project started from Innoscout course by lecturers Sirpa Lassila and Minna-Maari Harmaala during spring 2017, I would like to say Thank You to both Sirpa, Minna and my two other team members in the course - Thanh and Alena; especially to Sirpa Lassila, who continued to be my thesis's coordinator after the course and the commissioner Juha Linnekoski. To my family and friends, thank you very much everyone for supporting me with the process.

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